Engineering News-Record

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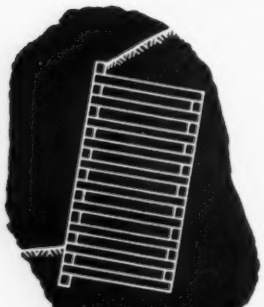
Transport Fights the Storm

How Blizzard-blocked Highways and Railways in the Middle West Were Cleared by the Maintenance Forces

BUILD SAFETY INTO YOUR ROADS



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What Price OBSOLESCENCE

WHENEVER Charles F. Kettering, director of research for the General Motors Corporation, chooses to reveal a glimpse of what goes on in his interesting mind, we are quite likely to get a new and stimulating slant on the relation of technology to modern social and economic life.

Recently he advanced the notion that taxes on industrial plants should be increased regularly as they become older until, within twenty years, it becomes cheaper to tear down the plants and build new ones. This bald proposal may shock those whose economic tastes are more conventional but it should be noted that Mr. Kettering qualified it by adding: "That, of course, might not be quite the solution, but something in that direction might at least be more sensible than it is now." It is safe to assume that his purpose in offering it is to emphasize his thesis that:

> "Probably the greatest obstacle to recovery is the difficulty of getting rid of obsolescence. * * * If every industrial plant in the country suddenly went out of existence there would be no unemployment, no hard times, no depression. We should all go to work to build new plants.
>
> "But they would not be like the old ones. They would be incomparably better. * * * But there is a reluctance to go ahead and have what we might have, because everybody is waiting to recover all possible value from what already exists.
>
> "There, you see, is the problem of getting rid of obsolescence. A man or a company builds a plant to manufacture certain articles. The plant is expected to last twenty or thirty years. But let us suppose that, in only two or three years, a new product is available which makes the output of this plant, as well as the plant itself, out of date. Surely this owner should somehow be encouraged to do something new. Not finding such encouragement, he thinks he must keep on using his old plant."

Although Mr. Kettering here describes a general tendency, we should note that many progressive producers actually do keep their plants and products up to date and do write off the capital values thus dissipated by technical progress. Every day we learn of vast replacement and modernization projects that are in line with Mr. Kettering's principle. The United States Steel Corporation announces that last year it dismantled seventy-six outmoded mills or furnaces and that since 1928 it has spent more than $400,000,000 for expansion and modernization. Other industrial enterprises, large and small, are announcing new plants and new products on a relatively comparable scale. To a considerable degree industry does do the job that Mr. Kettering advocates.

Neither is the process wholly lacking in "encouragement." The reading and advertising pages of every worth while technical and industrial journal are a constant encouragement and incitement to producers to scrap what is outmoded and to put their products, plants and processes on a higher plane of efficiency and salability. Thus the more progressive operators in each industry are in position to reduce their costs and to improve their products. And if a reasonable share of the gains thus achieved are passed on in the form of higher wages and lower prices, these operators can set the pace that must be maintained by competitive producers who would survive.

NATURALLY the net effect of such modernization is vitally affected by the technique of financing it. If the obsolete is written out of capital obligations under a sound amortization policy, well and good; but if the cost of the new merely loads additional capital claims on top of those already outstanding no true gain is made for the industry or for the community as a whole. In the long run, if nature be permitted to take its course, even the individual producer himself is bound to suffer.

Mr. Kettering rightly reminds us that a reluctance to scrap outmoded capital is a brake on technical progress. But before we take too seriously his suggestion that the taxing power be invoked as a remedy, we might overhaul the technique of capital financing. Perhaps in sound amortization, wage and price policies, we may find a remedy less dangerous than that of taxation, which has a tendency to get out of hand and to become habit-forming, with unfortunate effects on the patient.

Willard Chevalier

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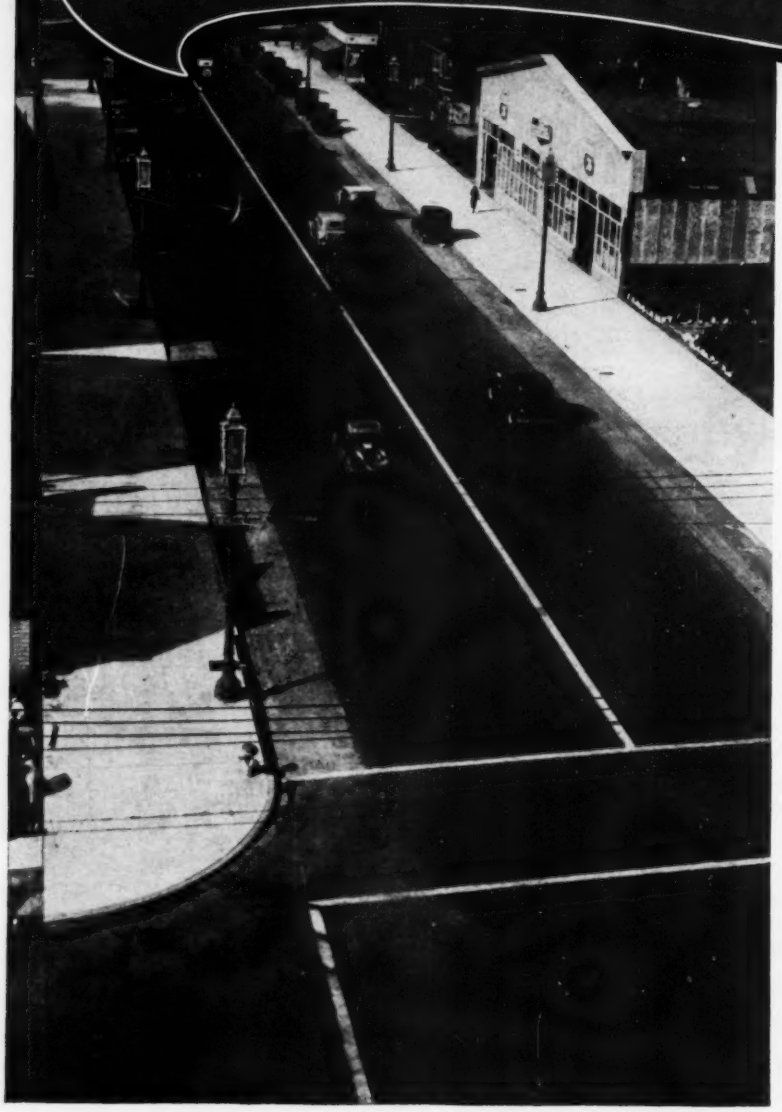
Industry's new buildings will be the subject of a series of articles to begin next week and run in the three following issues. After a five-year layoff, industry is building again, and the 1936 model reflects many advances over what was common in 1929. New roofs, new walls, new floors, air-conditioning, insulation and welding are some of the factors that challenge attention and of which the articles will afford an understanding.

KEEP IN YOUR LANE!



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ENGINEERING NEWS-RECORD

February 27, 1936

A SNOW FENCE collects the main drift and leaves only a shallower edge covering a Minnesota road that passes the house on the extreme left. More than 5,000,000 ft. of snow fence were installed on the highway system of that state.

Battling Snow Blockades

Roads and railways dig out of worst sub-zero wind and snow storm in years with astonishingly little delay to traffic

FOR NEARLY 60 DAYS all land transport in the Middle West has waged battle against snow blockade of its lines. Railways and highways alike have been repeatedly cleared of snow and again buried as new wind and snow storms swept over the northern Mississippi Valley states. The difficulties have far exceeded those of normal winter even in a land where winter is never a slight consideration in maintaining traffic.

Successive storms since the middle of December have accumulated from 1 to 4 ft. of snow, and at no time in this two months has there been thawing weather. The snow that has fallen is loose and fine and is whipped about by every stiff wind to form new drifts. Constant fighting of drifts has been necessary to keep roads and railways clear, and then on Feb. 8 and 9 came the blizzard snowfall that wiped out all of the work previously done. Gales of 30 to 50 miles and hour piled the loose fallen snow in drifts over every road and line of rails. The clearing of traffic had to begin anew and under conditions that had been made more difficult by previous clearing.

How these unprecedented conditions were met is told in the following statements by officials of the state highway departments. In all these accounts two facts of controlling importance are prominent: (1) that unusual storm and temperature conditions combined in attack; and (2) that regular maintenance forces and equipment repulsed this unusual onslaught.

* * *

MINNESOTA

J. T. Ellison, *Chief Engineer*

FOLLOWING the most severe storm and working under the most difficult conditions experienced since the creation of the trunk highway system sixteen years ago, the state highway maintenance forces opened for traffic 10,000 miles of snow-blocked main highway in 48 hours of continuous work with 300 units of equipment and 1,200 men. The storm began Saturday, Feb. 8, and continued through Sunday, Feb. 9; Saturday night and Sunday morning all roads were blocked; clearing began Sunday, and on Tuesday afternoon, Feb. 11, reports from the field forces showed 90 per cent of the trunk highway mileage cleared for all travel. But the storm snowfall does not tell all the snow story; this covers 60 exceptional winter days.

Since the middle of December there has been no thawing weather in Minnesota. Consequently, any snow that has fallen since that time is still loose and is blown around any time the wind exceeds 8 or 10 miles an hour, and at 25 miles an hour drifting takes place. In the southwestern part of the state this accumulated snowfall is 48 in., all still loose and constantly shifting with the wind. When the storm of Feb. 8-9 came along, not alone its snowfall but the previously accumulated snow was blown by the wind.

The Feb. 8-9 snowfall was not great in depth, not over 12 in. in any part of the state; the difficulty was not the depth of fall but the fact that the wind drove it (and the accumulated snow) fiercely about. In the open the air was so thick with snow that drivers of plows could not see beyond the truck and a man had to walk ahead to show the road; even then the drivers sometimes ran off the road. In contrast, in the wooded areas which extend north and northeast from the Twin Cities no particular difficulty was experienced. For example, the road from St. Paul to Duluth was kept continuously open although the snowfall was considerable, because the timber afforded protection

METHODS OF ATTACKING MINNESOTA DRIFTS vary with conditions. At left, a tractor plow makes a frontal attack on a 4-ft. drift, and at right a V-plow, with a wing on one side, skirts a deep drift to remove it by side cuts.

from the wind and there was no serious drifting.

Progress in clearing the roads from the Feb. 8-9 storm, was as follows: With all roads blocked Sunday morning, the wind then decreased a little, and by Sunday night most of the main roads except in the southwestern part of the state were open for traffic. By the afternoon of Tuesday (Feb. 11) practically all of the main roads and the greater part of the secondary roads of the state system were open. The field reports for Feb. 11 showed 90 per cent of all state roads carrying traffic.

The conditions affecting snow-removal operations were hard. All through the winter the great difficulty has been to get the roads fully cleared. They would just about be opened so that traffic could pass through but could not be widened out before another wind or snow storm would occur and they would again drift shut. In the Feb. 8-9 storm it was necessary on Sunday in some cases to open the road four or five times during the day to keep traffic moving.

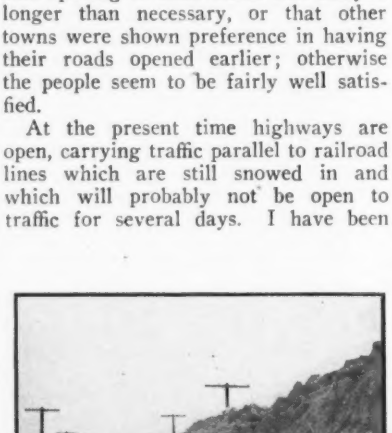
In the southwestern part of the state drifts 12 and 14 ft. in depth, covering a length of ¼ mile, were common. These could be removed only by a rotary snow plow, which of course involved rather slow work, and in many cases a crew of ten or fifteen men was detailed to work with the rotary to break down the snow in front, as otherwise the plow would simply attempt to tunnel through the drift and become blocked in. Work was also handicapped by extremely low temperatures, in some cases as low as 33 deg. below zero, accompanied by a wind as high as 45 miles an hour.

Many cuts were completely filled with snow packed solid by the high wind. Some highway underpasses under railroad tracks were completely filled, until the snow was tight against the structure of the railroad; this, of course, involved the use of a rotary plow to reach the structure and hand digging to clean the snow out from under it. As stated before, visibility during the storm was practically zero, which made the operation of the equipment almost impossible.

The removal equipment used consisted of 300 units, embracing trucks with snowplows and spreader wings, rotary plows (both tractor and truck type) and push plows operated by caterpillar tractors. This equipment was manned by about 1,200 men, or about four men in service with each unit. Whenever weather conditions were such that the equipment could be worked, it was kept in constant operation 24 hours.

There has not been any substantial criticism on account of highway traffic tie-up in Minnesota. There have been, or course, certain communities that felt that opening of their roads was delayed longer than necessary, or that other towns were shown preference in having their roads opened earlier; otherwise the people seem to be fairly well satisfied.

At the present time highways are open, carrying traffic parallel to railroad lines which are still snowed in and which will probably not be open to traffic for several days. I have been advised that one railroad in southern Minnesota has not been able to operate any trains at all during the past twelve days, and I know that up to this morning none of the railroads extending southwesterly out of Minnesota were able to carry traffic, many of them being still blocked. I believe, without taking credit to myself in any way, that the men who are responsible for the maintenance of the highways, and who have worked so faithfully under extremely difficult conditions, deserve unlimited credit for opening practically 10,000 miles of highways in a two-day period. —FEB. 11.



SOME of the Wisconsin drifts were so high that clamshell excavators were required to cast the snow clear of the road.

* * *

WISCONSIN

W. Hoenig, *Maintenance Engineer*

IT IS practically impossible to make an authentic report of the highway blockade by the recent blizzard, because we have had a blizzard and snow storm for the past three weeks.

The severest storm has been in the southern half of the state, especially along the short of Lake Michigan from Manitowoc south to the state line. The snowfalls range all the way from 4 in. to 1 ft., and it snows nearly every other day. The total snowfall in some parts is from 3 to 4 ft. Traffic has been tied up in the southeastern part of the state on the secondary highways. All main U. S. and state trunk highways have been kept open. All equipment has been worked 24 hours a day for the past three weeks. Between 700 and 800 plows are being used, and from 3,000 to 4,000 men have been employed.

Over 1,200 miles of snow fences have been erected, but it is impossible to stop all drifts in the open country. In the northern part of the state where there is considerable timber the drifting is not so bad. We have snowdrifts from 8 to 20 ft. high. In some of the cuts it is impossible to blow the snow out with a rotary plow due to the high banks of snow on each side. In some

instances we are using clams and steam shovels in casting the snow from the highways. If the storm continues, it will be practically impossible to keep even the main highways open.

—FEB. 14.

* * *

SOUTH DAKOTA

F. H. Schrader, *Highway Engineer*

VERY LITTLE additional snow fell in South Dakota just prior to or during the blizzard of Feb. 8 and 9. Snow existing at the beginning of this storm was accumulation from past storms. This blanket was fairly general throughout the state, ranging from 3 in. in the west and central portions and increasing gradually toward the east and south to a maximum of 15 in. in the extreme east and southeast sections. This snow appeared to be fairly well compacted with very little previous drifting.

On Feb. 4 local areas were visited by light falls and strong winds causing short tie-ups of a very minor nature, but in some places filling road ditches. Snow drifts at low-grade points were rapidly cleared by truck and patrol units.

On Feb. 7 strong winds blew over the entire state with tie-ups probable. This continued into Feb. 8 when the main storm struck from the west with wind velocities reaching 50 miles per hour and temperatures of 25 to 30 deg. below zero. Old compacted drifts were cut loose, and visibility was reduced to as low as 75 to 100 ft. Traffic was immediately warned from all highways by the use of all available radio broadcasting stations. This snow was very fine and caused compacted drifts, which later proved very difficult to remove.

Equipment was held up until the night of Sunday, Feb. 9, when the storm began to blow itself out in the west section, from which point the removal attack was started. Due to previous light snows, points requiring removal were scattered. Well-graded road sections suffered very little, high wind velocities keeping them clear. Removal was started in the central part of the state on Sunday night, Feb. 9, prior to the abatement of the storm due to possibilities of coal and food shortages and also to deaths from freezing in remote areas.

On Feb. 9 the storm had about blown out in all sections, and all available equipment was swung into action. In the extreme east sections where previous snow falls had been heaviest (and due to the compacted condition of the drifts) equipment heavier than trucks and patrols was required. These smaller units were immediately supplemented by tractor units. Main highways were opened to full traffic on Feb. 11 with one or two exceptions, and 50 to 75 per cent of the removal was completed on Feb. 10.

Due to the direction of the storm, which was almost straight from the west, snow fences placed for prevailing northwest winds, failed to function fully. Grades, where above existing prairie level, scoured clean. New design sections with wide and deep ditch sections proved of great value, and backslope flattening assisted greatly in keeping many sections clear. Wind breaks, where properly placed, will show their advantage in circumstances of this nature. Snow drifts, windrowed in fields as additional snow-fence protection were of little avail due to the cutting action of the wind. —FEB. 11.

* * *

NORTH DAKOTA

Ray Robinson, *Traffic Engineer*

NORTH DAKOTA has had more snow this winter than for several previous winters. The fall has been heaviest in the northeast quarter of the state, and here also there has been more wind and much more snow on the roads.

TRUCKS with wing plows performed excellently in clearing the plains roads of North Dakota.

From Oct. 1 to Jan. 31 the snowfall at various points has been as follows:

	Inches
Bismarck	25.7
Dickinson	17.7
Williston	22.3
Valley City	14.1
Fargo	21.5
Minot	23.4
Devils Lake	17.4
Grand Forks	31.4
Jamestown	23.5

Considerable snow has fallen since Jan. 31; all the snow is loose, causing trouble every time the wind blows.

Practically all main highways were kept open until Feb. 1; in one or two cases traffic was tied up for three or four hours. Since Feb. 1 traffic has been tied up as long as 36 hours on two or more of the main highways, especially in the northern part of the state.

The highway department has 550 miles of slat snow fence along state highways; it also piles up snow ridges adjacent to the highways, which are very effective in stopping drifts. The slat snow fence is effective until it is completely drifted under. Deep cuts cause very little trouble due to the fact that they are protected by snow fences.

About 30 snowplows of various types are operated; this equipment does very effective work until large drifts or windrows are formed along the shoulders of the roadway; after these windrows have formed, it takes very little snow to block the highways. Snow removal this winter is very difficult due to the extreme cold weather, heavy snowfall and strong winds. After storms, all department equipment is put to work on the main highways, and they are the first to be opened. —FEB. 13.

* * *

IOWA

Fred R. White, *Chief Engineer*

IT STARTED SNOWING in Iowa about Dec. 20 and has continued snowing intermittently to this date. There has been substantially no thawing; temperatures since the first week in January have ranged from zero down to 40 deg. below zero. We now have on the ground the accumulation of all the snow that has fallen since Dec. 20; this snow covers the entire area of the state; it varies in depth from about 24 to about 40 in.

Previous to the blizzard of Feb. 3 the state roads were kept open at all times; there were no interruptions to traffic on account of the snow. On Feb. 3 we had a fresh fall of 4 to 8 in. of snow, accompanied by strong winds and there was serious drifting. Visibility was so bad that operators of the snow-removal equipment could see only a few feet. They could accomplish nothing. On the evening of Feb. 3 we called all snowplows in until the storm should abate. The wind died down about daylight of Feb. 4. All available snow-fighting equipment was immediately sent out onto the roads, and all important state roads were opened promptly. By nightfall of Feb. 4, about 90 per cent of the entire mileage of the state road system had been cleared of snow and was open to traffic.

The maximum interruption of traffic on any of the main trunk state roads was about 12 hours. By this time (Feb. 4) snow conditions were really getting bad. Snow fences were drifted full, so that they were no longer of any value in preventing additional drifting. Side ditches were filled full of snow. Great ridges of snow lined the highways, often on both sides. The set-up was perfect for a blizzard such as came on Feb. 8 and 9.

On the morning of Feb. 8 additional snow was falling, accompanied by winds of 40 to 50 miles per hour. Temperatures of 15 to 25 deg. below zero prevailed throughout the state. This storm continued throughout Feb. 8 and 9. A total of 3 to 10 in. of fresh snow fell. Drifts 4 to 10 ft. in depth were formed. By noon of Feb. 8 visibility at points where drifts were forming was near zero. Snowplow operators could not

see the road they were trying to clear. Any general attempt to keep the whole state road system open was abandoned. Efforts were concentrated on the relief of human suffering, providing fuel, medical attention, etc. The storm continued throughout Feb. 8 and 9. It abated early on the morning of Feb. 10. Practically the entire state road system of 8,300 miles was blockaded. All available men and snow-removal equipment were on the road by daylight of Feb. 10, and operations continued night and day.

The progress of opening state roads to traffic was as follows:

By 6 p.m. on Feb. 10, 66 per cent of the total mileage of the state road system was open to traffic.

By 6 p.m. on Feb. 11, 79 per cent of the state roads were open to traffic.

By 10 a.m. on Feb. 12, 83 per cent of the state roads were open to traffic.

This blizzard was the worst that the state has experienced in 25 years. Within twelve hours after the storm abated and the wind died down so that snow-removal equipment could be operated, two-thirds of the entire mileage of the state road system was open and available for traffic. Opening of the remaining one-third of the state road system proceeded rapidly.

Snow-removal operations in this state this year require no defense; results speak for themselves. In the worst winter experienced in a quarter of a century or more, the interruption of traffic due to snow, as outlined above, has been so insignificant as to be scarcely worth mentioning. The history of public service in Iowa contains no brighter page than the record of the battle put up by our maintenance men in fighting this winter's snow. They have worked night and day without rest. They have been ready to go at any time, regardless of conditions. This state is proud of these men and their accomplishment.

—FEB. 14.

* * *

ILLINOIS

Ernst Lieberman, *Chief Highway Engineer*

THE MOST SERIOUS highway traffic tie-up in many years in Illinois occurred from about noon Saturday, Feb. 8, until Monday night, Feb. 10. This was occasioned by a snow storm which covered the state northward from Quincy through Beardstown, Bloomington, Streator, Plainfield and Chicago. There was a considerable amount of snow south and east of the points mentioned with considerable drifting but not sufficient to cause serious blockades.

An unprecedented series of snow storms and ice formations, accompanied by high winds, began about Dec. 12 to 26, 1935, Jan. 18 to 23, Feb. 3 and Feb. 8 to 10, 1936. The snowfalls have been immediately followed by below-zero temperatures, and at no time since Dec. 25 have the temperatures been high enough to melt away the gradually accumulating drifts from the highways. The condition has resulted in snowfalls on top of earlier snows. The snows have been exceedingly dry, and wind velocities immediately following the storm have been abnormally high.

ROADS IN ILLINOIS have been so blocked by a succession of storms that no roadside space remains to place the snow and future falls may require hauling.

The storms seem to have hit with disheartening persistence in the same area in the northern end of the state. This has resulted in gradually increasing ridges of snow piled along road shoulders and in the roadside ditches. At the present time the right-of-way capacity has been so filled with snow in the locations of drift formations that there is no longer any place for the plows to put the snow from the succeeding falls. In extreme emergency it will become necessary to haul the snow from the drifts and dump it beyond the limits of the drift formations, which in some cases will be a distance of one-half mile.

The velocity of the wind and the extreme dryness of the snow, rather than the number of inches of snowfall, have contributed to the seriousness of this condition. For example, on Dec. 25 considerable drifting occurred with a bright sun shining and a layer of loose snow on the ground surface. This same condition prevailed immediately after the snow of Jan. 18.

The snow of Feb. 8 fell on previously accumulated snowfalls that were from 3 to 18 in. in depth over the northern part of the state. The resulting accumulation was reported as being from 12 to 24 in. on level ground.

With roads already piled high with ridges of snow pushed out by the plows, and with a reported wind velocity of 40 miles per hour, the snow of Feb. 8 was drifted in such dense masses that visibility was reduced almost to zero. Many reports were received stating that drivers were unable to see the radiator caps on their trucks and cars. This almost total lack of visibility caused the abandonment of hundreds of privately owned trucks and cars, some in the rapidly accumulating drifts and some evidently abandoned on open roads for fear of accidents. Numerous head-on and rear-end collisions resulted from the lack of visibility and the stalling of vehicles. Car and truck occupants took refuge in the nearest shelters afforded by schools, farm houses and small towns. The snowplows of the highway department worked through Saturday afternoon and night, but the drifts closed in behind the plows as fast as the roads were opened. On Sunday the storm continued throughout the day. Traffic was at a standstill because of blockades and the lack of visibility and the intense cold.

Since several collisions occurred between snowplows and abandoned trucks and cars and as it was clearly evident that it was impracticable to keep the highways open for traffic, the plows were ordered to stand by until the cessation of the storm. The drifting continued throughout Sunday and the greater part of Monday. A considerable amount of rescue work was done by the plow crews in response to requests of stranded motorists who were in difficulty. On Monday morning, plows were again started out and, as the wind gradually died down and the drifting ceased, some progress was made. To help with this work, seventeen of the heaviest and best-equipped snowplows and trucks were transferred from central and southern parts of the state to the affected territory.

There has been an enormous amount of damage to trucks and plows, caused not only by the last storm but also by previous storms. Garage mechanics worked faithfully for long hours. So many repair parts for the trucks and plows were required that supplies were seriously depleted. Dealers and supply houses cooperated by keeping their offices open nights and Sundays in order to take care of the extreme demand for parts.

The north and south roads were more seriously affected by drifting than the

east and west roads because the prevailing winds have been from the west. The most serious difficulty occurred on roads with narrow right-of-way on account of restricted storage space. It was possible to keep four-lane highways open for two-lane traffic.

Most drifts form opposite bare fields and pastures and usually are more troublesome in cuts 3 to 8 ft. in depth. Snow fence has proved useful in minimizing the effect of such drifts. Ordinarily, deep cuts provide enough storage space to prevent snow blockades. However, the unusual succession of storms has resulted in the drifts as deep as 20 ft. in cuts.

State highway maintenance police rendered valuable assistance during the storm periods by assisting motorists. Radio stations and newspapers cooperated by means of announcements and articles describing weather and road conditions.

In view of the unusual severity of the weather conditions it is evident that recent improvements in snow-fighting methods and equipment and the cooperation of interested agencies enabled the department to serve the motorists to a degree unobtainable in the past.

—FEB. 14.

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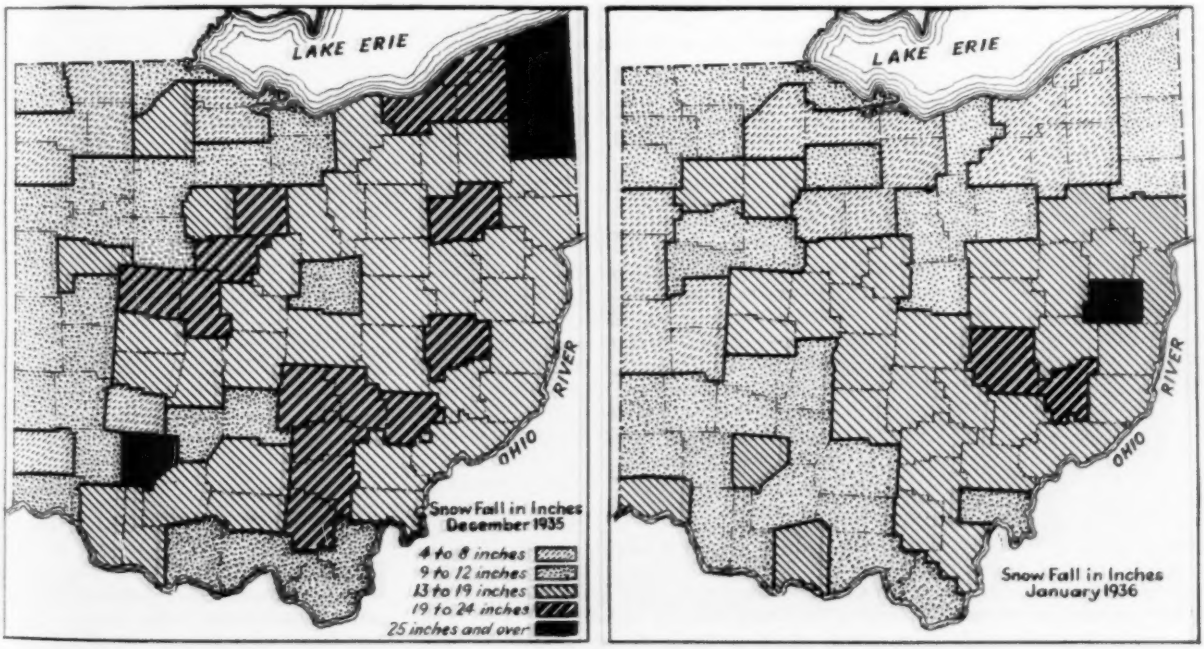

SNOWFALL IN OHIO for December and January shows shifting areas of heavy precipitation.

see the road they were trying to clear. Any general attempt to keep the whole state road system open was abandoned. Efforts were concentrated on the relief of human suffering, providing fuel, medical attention, etc. The storm continued throughout Feb. 8 and 9. It abated early on the morning of Feb. 10. Practically the entire state road system of 8,300 miles was blockaded. All available men and snow-removal equipment were on the road by daylight of Feb. 10, and operations continued night and day.

The progress of opening state roads to traffic was as follows:

By 6 p.m. on Feb. 10, 66 per cent of the total mileage of the state road system was open to traffic.

By 6 p.m. on Feb. 11, 79 per cent of the state roads were open to traffic.

By 10 a.m. on Feb. 12, 83 per cent of the state roads were open to traffic.

This blizzard was the worst that the state has experienced in 25 years. Within twelve hours after the storm abated and the wind died down so that snow-removal equipment could be operated, two-thirds of the entire mileage of the state road system was open and available for traffic. Opening of the remaining one-third of the state road system proceeded rapidly.

Snow-removal operations in this state this year require no defense; results speak for themselves. In the worst winter experienced in a quarter of a century or more, the interruption of traffic due to snow, as outlined above, has been so insignificant as to be scarcely worth mentioning. The history of public service in Iowa contains no brighter page than the record of the battle put up by our maintenance men in fighting this winter's snow. They have worked night and day without rest. They have been ready to go at any time, regardless of conditions. This state is proud of these men and their accomplishment.

—FEB. 14.

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ILLINOIS

Ernst Lieberman, *Chief Highway Engineer*

THE MOST SERIOUS highway traffic tie-up in many years in Illinois occurred from about noon Saturday, Feb. 8, until Monday night, Feb. 10. This was occasioned by a snow storm which covered the state northward from Quincy through Beardstown, Bloomington, Streator, Plainfield and Chicago. There was a considerable amount of snow south and east of the points mentioned with considerable drifting but not sufficient to cause serious blockades.

An unprecedented series of snow storms and ice formations, accompanied by high winds, began about Dec. 12 to 26, 1935, Jan. 18 to 23, Feb. 3 and Feb. 8 to 10, 1936. The snowfalls have been immediately followed by below-zero temperatures, and at no time since Dec. 25 have the temperatures been high enough to melt away the gradually accumulating drifts from the highways. The condition has resulted in snowfalls on top of earlier snows. The snows have been exceedingly dry, and wind velocities immediately following the storm have been abnormally high.

ROADS IN ILLINOIS have been so blocked by a succession of storms that no roadside space remains to place the snow and future falls may require hauling.

The storms seem to have hit with disheartening persistence in the same area in the northern end of the state. This has resulted in gradually increasing ridges of snow piled along road shoulders and in the roadside ditches. At the present time the right-of-way capacity has been so filled with snow in the locations of drift formations that there is no longer any place for the plows to put the snow from the succeeding falls. In extreme emergency it will become necessary to haul the snow from the drifts and dump it beyond the limits of the drift formations, which in some cases will be a distance of one-half mile.

The velocity of the wind and the extreme dryness of the snow, rather than the number of inches of snowfall, have contributed to the seriousness of this condition. For example, on Dec. 25 considerable drifting occurred with a bright sun shining and a layer of loose snow on the ground surface. This same condition prevailed immediately after the snow of Jan. 18.

The snow of Feb. 8 fell on previously accumulated snowfalls that were from 3 to 18 in. in depth over the northern part of the state. The resulting accumulation was reported as being from 12 to 24 in. on level ground.

With roads already piled high with ridges of snow pushed out by the plows, and with a reported wind velocity of 40 miles per hour, the snow of Feb. 8 was drifted in such dense masses that visibility was reduced almost to zero. Many reports were received stating that drivers were unable to see the radiator caps on their trucks and cars. This almost total lack of visibility caused the abandonment of hundreds of privately owned trucks and cars, some in the rapidly accumulating drifts and some evidently abandoned on open roads for fear of accidents. Numerous head-on and rear-end collisions resulted from the lack of visibility and the stalling of vehicles. Car and truck occupants took refuge in the nearest shelters afforded by schools, farm houses and small towns. The snowplows of the highway department worked through Saturday afternoon and night, but the drifts closed in behind the plows as fast as the roads were opened. On Sunday the storm continued throughout the day. Traffic was at a standstill because of blockades and the lack of visibility and the intense cold.

Since several collisions occurred between snowplows and abandoned trucks and cars and as it was clearly evident that it was impracticable to keep the highways open for traffic, the plows were ordered to stand by until the cessation of the storm. The drifting continued throughout Sunday and the greater part of Monday. A considerable amount of rescue work was done by the plow crews in response to requests of stranded motorists who were in difficulty. On Monday morning, plows were again started out and, as the wind gradually died down and the drifting ceased, some progress was made. To help with this work, seventeen of the heaviest and best-equipped snowplows and trucks were transferred from central and southern parts of the state to the affected territory.

There has been an enormous amount of damage to trucks and plows, caused not only by the last storm but also by previous storms. Garage mechanics worked faithfully for long hours. So many repair parts for the trucks and plows were required that supplies were seriously depleted. Dealers and supply houses cooperated by keeping their offices open nights and Sundays in order to take care of the extreme demand for parts.

The north and south roads were more seriously affected by drifting than the

east and west roads because the prevailing winds have been from the west. The most serious difficulty occurred on roads with narrow right-of-way on account of restricted storage space. It was possible to keep four-lane highways open for two-lane traffic.

Most drifts form opposite bare fields and pastures and usually are more troublesome in cuts 3 to 8 ft. in depth. Snow fence has proved useful in minimizing the effect of such drifts. Ordinarily, deep cuts provide enough storage space to prevent snow blockades. However, the unusual succession of storms has resulted in the drifts as deep as 20 ft. in cuts.

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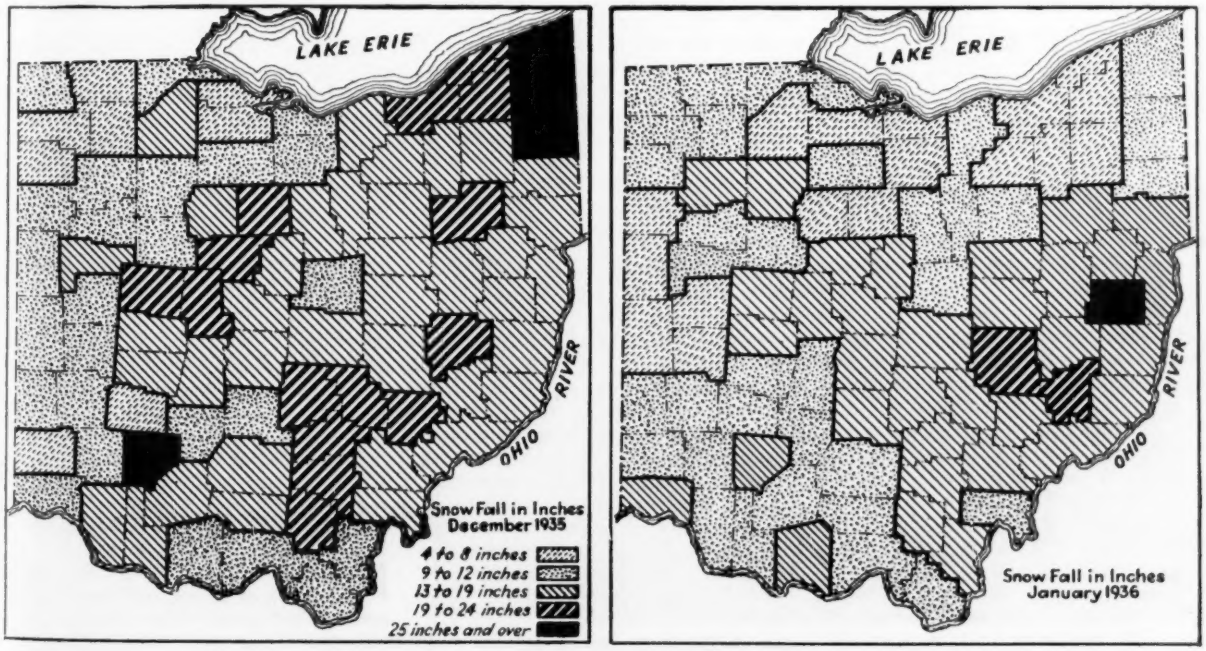

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tions of the state but with a promise of general dimensions.

We have a maximum of 32 in. of snow on the level in the vicinity of Muskegon and along the western part of the lower peninsula. This depth decreases somewhat toward the east. However, had this been the type of storm where the wind was not such an important factor, we would have had no difficulty in removing the snow as it fell. Our difficulty in clearing the roads was due entirely to the high wind, causing excessive drifts and low visibility which made it impossible to operate equipment until the wind had abated.

Traffic was maintained almost without exception on the east and west roads during the entire period of the storm. Although some of the north and south roads were blockaded for a time, we were able to keep at least two of our main north and south roads open with only a few hours of interruption.

The snow was removed by V-plows and one-way plows mounted on both trucks and tractors. Where the snow drifts were severe, tractor plows with rotary attachments were used. The state has four "Snogoes,' which are being used to widen the cuts through deep drifts and clear the snow from the shoulders to provide additional storage space. These outfits are operating at the present time and will continue to operate for a couple of weeks before this job has been completed.

Snow fences and wind breaks were effective in stopping the snow from building drifts from the location of the fence to the highway. These are ordinarily placed at a distance of 85 ft. from the roadway. The drifts extended the full depth of the snow fence and from the snow fence to and across the road in many cases. We are now engaged in raising the snow fence and constructing more again to make them effective. We have 730 miles of snow fence on the trunk-line system.

Many of the narrow cuts were drifted full of snow, but on our newer construction where we have 36-ft. grades and wide cuts sufficient snow storage capacity has been provided to hold the snow, and only drifts of minor proportions extended to the roads at these points.

It might be interesting to note that on M-55 between Cadillac and Manistee, a road in the district where the storm was most severe, no snow-removal difficulties were encountered. This road, 50 miles in length, passes through a section of cut-over land with sufficient second-growth timber to check the wind and cause a uniform layer of snow to be deposited. Part of this road was plowed with a 1½-ton truck without difficulty, and on one end of this highway the snow condition was not considered serious enough to warrant plowing at all. This road was built on a raised grade which has a tendency to cause the snow to lodge either at one side or be blown across the roadway.

Our difficulty in blockades was serious on only one important trunkline. That was US-31, extending from the Indiana state line to the Straits of Mackinaw. However, it might be significant to mention at this time that no railroads were operating in this district. As a matter of fact, the hghways were open well in advance of the railroads. Although this road was closed, there were very few points in the state which were not accessible at all times.

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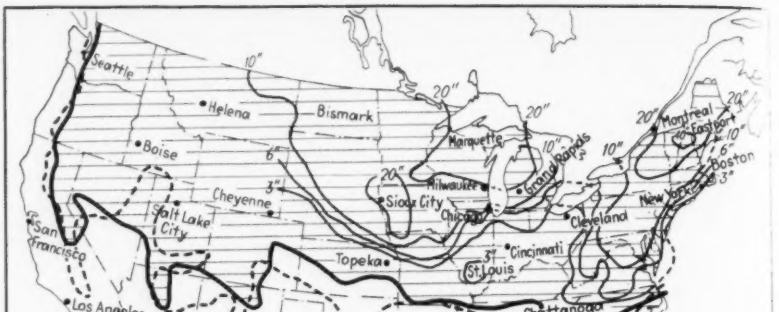

SNOW MAP shows snow areas and snow depths in the United States as of Feb. 10. Dotted line shows limits of previous weeks' cover, including storm of Feb. 8-9.

* * *

ST. PAUL R.R.

ALL of the Chicago, Milwaukee & St. Paul divisions have experienced serious difficulties from snow and cold weather, delaying main-line traffic four to five hours, but no schedules have been annulled. Three of the eight rotary plows kept busy in ordinary winters west of the Missouri River in the Bitterroot and Cascade divisions have this season been moved to divisions east of the river, something that has not been necessary for ten to fifteen years. Much difficulty in clearing cuts has been due to changes in wind directions, so that whatever the direction of the road the cuts have been filled; the last heavy wind changed from north and northwest to east. Unlike a year ago little dust is mixed with the snow in the Milwaukee territory. Old snow fences have been lifted in many cases after being buried, and a large mileage of new fences has been set on top of the hard-packed snow over buried fences in the western area, where 10 ft. of snow on the level is not uncommon. Fortunately no sleet has bothered telegraph wire lines.

In terminals, Milwaukee, Wis., with 3 ft. on the level, has caused the most trouble. Contractors' trucks, some equipped with plows, have been hired in great numbers to clear the tracks. No new equipment in the way of track heaters or torches has been installed recently. From five to six times as many men as would be hired ordinarily in winter, or as anticipated, have been employed.

* * *

ROCK ISLAND R.R.

THE Rock Island terminals have been operating normally throughout the winter so far, thanks to full crews and plenty of extras. New electric switch heaters installed in some of the Chicago yards have given a good account of themselves; they operate as well as in summer, say officials, and at less cost than gas heaters.

Main-line (7,000 of the 8,000 miles) schedules have been maintained throughout the recent series of storms but with delays up to twelve and fourteen hours. Three rotaries have been kept busy clearing cuts, one on the Kansas City-Minneapolis Division, one west of Omaha and one on the El Paso-Dalhart division. This southwest area is difficult because of the mixture of snow and sand which packs especially hard. Branch lines have been open one day and closed the next. At the end of last week reports came in of new zero weather and heavy snows in Iowa, where the worst difficulties have been experienced, especially on the north and south lines.

* * *

ILLINOIS CENTRAL R.R.

FOR SEVERAL DAYS last week most railroad schedules through Iowa were in bad shape. The Illinois Central, three lines west of Waterloo, annulled all trains for three days, cuts

being filled to the top after snow fences had been buried. The snowfall was about 14 in. in this western territory. East of Waterloo to Chicago the main-line trains were help up only four hours, but the four branches were in difficulties for the same three days as were those west of Waterloo, a number of trains being caught in drifts. Previous storms in I.C. territory west had not seriously disturbed schedules, although some cuts had been filled—at one time with wind-blown drifting snow when no snow was falling. Service to the south has not been materially affected.

Chicago terminal troubles were not unusual, the forces being able to keep main-line tracks, switches and signal systems from freezing by the use of the regular winter equipment of weed burners, gas and electric heaters, oil burners and salt. Salt has a limit at about zero and, like other schemes that are intermittent, is not so good when the water from melting snow cannot get away. With the possible exception of a gas-engine-driven vibrating spade, used to chisel out ice formed under set-out passenger cars where condensing steam had frozen, no new equipment has been used; many coaches and Pullman cars were frozen to the tracks.

* * *

BURLINGTON R.R.

THE BURLINGTON has maintained main-line traffic fairly close to schedule with no annulments, but the last two weeks are called "very trying" and the amount of snow "tremendous," particularly in Iowa and on the northwest part of the system. At the end of last week several branch lines were still closed. The difficulty has been with the light character of the snow, which drifted badly until the warmer weather at the end of last week melted it down somewhat. Heavy floods next spring are anticipated. Two rotary plows have been constantly at work in the western part of the lines. No new equipment has been purchased recently. Except for a tie-up at the Galesburg, Ill., terminal for a single day, terminals have been kept open with 700 cars of coal passing on Feb. 14. Freight trains on main lines have gone through but were much delayed. Heaters, flame machines and other thawing agencies, including salt, have been utilized as never before, and the number of extra men employed has been large.

* * *

NORTHWESTERN R.R.

THE Chicago & Northwestern Ry. has had main lines from Chicago west to Omaha and northwest to Twin Cities open throughout the ten-day blizzard period with the aid of four rotary plows, which have been in continuous use. Schedules have been maintained, with an hour or two delay, but always there has been at least one of the double tracks open. The worst troubles have been in the shore-line divisions to Green Bay, Wis., where there has been an unusual amount of snow, severe weather and drifting winds that filled cuts. The line has been open and closed several times. Drifts have covered telegraph wires, requiring shovelers to uncover them. Buried snow fences have been replaced by new ones set on top of the drifts. The Wyoming and Dakota lines have been seriously out of commission, and branches, generally left to local officials, were at the end of the week still digging out.

The road's terminals, by the aid of extra large forces of men, have been kept in fair winter operating condition. No new equipment has been devised, but everything available, including ditchers and excavators, has been pressed into service. The officials optimistically indicate that they are "on top of the job."

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POSTCRIPTS RECEIVED BY TELEGRAPH

North Dakota, Feb. 22—Stormed Monday and Tuesday, Feb. 17-18; all traffic and snow-removal equipment tied up by drifts 5 to 10 ft. deep. Clearing started Feb. 19, working 24 hours a day; progress slow. Except on one highway (No. 10) all through traffic tied up until Feb. 21; all US highways will probably be open by Feb. 24. Another storm will tie up traffic for at least ten days.

Ohio, Feb. 22—Northwestern corner of state still under glare ice and deep drifts. All state roads now open for two-way traffic except few north and south secondary roads in ice and drift district.

Michigan, Feb. 22—Third Michigan storm previously reported as beginning proved less serious than anticipated with fluffy snow and moderate-to-high winds. The chief trouble was drifting, which filled previous cuts. Heavy equipment continued work in southern Michigan and on Feb. 14 had opened all but 75 miles of trunk-line system; Feb. 17 only two or three minor trunk-lines were closed.

Minnesota, Feb. 21—Drifting winds prevailed each day from Feb. 12 to Feb. 18 inclusive. Winds causing drifts ranged from 10 to 30 miles per hour. In some districts roads have been opened four or five times daily during seven of past ten days. More than 95 per cent of trunk-highway system open on morning of Feb. 21; expect entire system open Saturday morning, Feb. 22. More than 2,000 vehicles have been pulled out of drifts during the past ten days; many passed snowplow equipment along open sections only to become involved in drifts ahead, causing delays to snow-fighting equipment, since all had to be extricated before plowing operations were resumed. Snowfalls during the past week ranged from 1 to 5 in. The total snow to Feb. 20 ranged from 29 to 63 in. Temperatures as low as 36 deg. below zero prevented snow from tying down, making the drifts extremely hard and dense. Some of our sixteen districts employed upward of 200 men hand-shoveling with the plows. With all units in operation, snow plowing cost about $2,000 per hour; the anticipated total expenditure for snow control is about $1,000,000. The revenue from the gas tax by keeping the roads open far exceeds costs of snow plowing. Plowing was also justified by prevention of economic loss of foodstuffs and fuel shortages, in many cases fuel being distributed by truck from towns that were open to rail service to those closed to rail service.

A ROTARY PLOW widening an opening cut on a Minnesota road. This machine was also highly effective in making opening cut.

Welded Structure Design for Dynamic Loads

A method of determining endurance-limit unit stresses, main material sections and weld areas, with particular reference to bridge requirements

By Otis E. Hovey
Consulting Engineer, New York, N. Y.

IN THIS ARTICLE Mr. Hovey brings to attention a question of great present importance: how should welded joints and the members of welded structures be proportioned for dynamic stress as compared with those that carry static stress only? Recognizing the lack of test data that ordinarily would be used as a basis for such design, he utilizes an equation developed by H. F. Moore and T. M. Jasper, of the University of Illinois, from their studies of the fatigue of metals. This expression, giving the relation between the unit stresses for various combinations of minimum and maximum stresses in a member, furnishes a convenient basis for analysis and the development of formulas for determining the required main-member material and the area of weld for any kind of stress. —EDITOR.

THE RAPID GROWTH in the acceptance and use of welding in the structural field raises particular questions with respect to the design of bridges where dynamic rather than static loads are involved. The questions take on added importance because available tests on welded joints, while numerous, provide very little data concerning their behavior in a bridge under traffic. Under the circumstances it would seem best to devise a design procedure that takes into account the endurance limits found from tests of various types of welds. A method that simplifies the various combinations of pulsating and reversing stresses in welded bridge members is developed in this article together with a series of appropriate specification clauses.

Knowledge of fatigue of materials

Sir William Fairbairn's experiments on iron girders 75 years ago established the fact that repeated applications of loads much smaller than the static breaking load may cause failure. Also that the number of applications of the load to produce failure increase rapidly as the applied load is diminished. Ten years later Wöhler published the results of his classical experiments on iron and steel subjected to repeated direct, torsional and bending stresses, which may be said to be the first experiments on fatigue of metals. Since that time many researches have been made concerning the fatigue characteristics of many kinds of metal. Launhardt and Weyrauch developed formulas and methods of design which were based upon Wöhler's experiments, and during 1887 the Pennsylvania Railroad incorporated them in a specification for wrought-iron bridges and in 1897 in a specification for steel bridges.

The specification of 1887 required the use of a different unit stress for each combination of minimum and maximum stress. The specification of 1897 simplified the procedure by the application of factors to the stresses, which took account of the various stress combinations in such a manner that a constant basic unit stress was applied to the adjusted maximum stresses, and which required the same sectional areas as those called for by the 1887 specifications, for the same combinations of minimum and maximum stresses in a member. Although the factors have been modified from time to time, this general method of designing still is in use.

Stresses for dynamic loads

In determining maximum stresses, many railway and highway bridge specifications provide that an addition, called impact, shall be made to the calculated live-load stresses. The present practice is to calculate the so-called impact as the dynamic increment; which would increase the live load to its static equivalent, so that the sum of the dead load, live load and impact stresses becomes the maximum total stress that a member must carry during the life of the bridge.

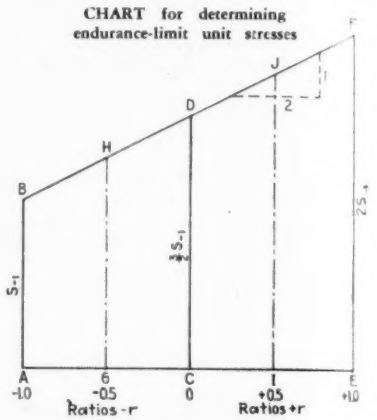
Long experience has indicated constant basic unit stresses that may safely be used for various grades of steel when subjected to stresses pulsating from zero to a maximum or from a lesser to a greater stress in the same direction. When a member is subjected to stresses in opposite directions, the minimum and maximum stresses usually are combined in accordance with some rule that is correct only for certain important combinations and approximate for others. The combinations having been made, constant unit stresses are applied when determining the required sectional areas.

There are few data concerning welds under dynamic loads and none of them seem to indicate that a constant unit stress in a weld is appropriate for pulsating stresses. However, if an equivalent maximum stress can be found for any member which takes account of the pulsating or reversing stresses to which it is subjected, a constant unit stress in the particular type of weld to be used may then be applied to this equivalent maximum stress in order to find the area that must be used.

Endurance limit stresses

During 1923 the University of Illinois issued Bulletin No. 136, entitled "An Investigation of the Fatigue of Metals," by H. F. Moore and T. M. Jasper. On p. 89 there is given a simple expression of the relation between the unit stresses for various combinations of minimum and maximum stresses in a member. This approximates closely the relations found by other investigators,

CHART for determining endurance-limit unit stresses



and forms a convenient basis for analysis. The expression is:

$$S_r = S_{-1}\left(\frac{r+3}{2}\right) \qquad (1)$$

in which r = the algebraic ratio ($\pm$) of the minimum stress to the maximum stress during a cycle of stress, S_{-1} = the endurance limit for fully reversed stress, and S_r = the endurance limit for ratio r.

The relations expressed by Eq. 1 may be illustrated graphically as shown in the accompanying chart, in which negative and positive ratios, r, are laid off to the left and right of point C. $A\,B$ is the endurance-limit unit stress, S_{-1}, for fully reversed stresses, and $C\,D$ is 3/2 $A\,B$. Endurance-limit unit stresses are given on line $B\,D\,F$.

Consider a positive stress of 100,000 lb. to be combined with various negative and positive stresses. Assume that the endurance-limit unit stress, S_{-1}, for fully reversed stresses is 10,000 lb. per sq.in. By substitution in Eq. 1 the following unit stresses, S_r, are found:

Combinations of Minimum and Maximum Stresses	Endurance-Limit Unit Stress, S_r	Line in Chart
− 100,000 with + 100,000	10,000	$A\,B$
− 50,000 with + 100,000	12,500	$G\,H$
0 with + 100,000	15,000	$C\,D$
+ 50,000 with + 100,000	17,500	$I\,J$
+ 100,000 with + 100,000	20,000	$E\,F$

Similar calculations may be made for

any combination or reversing or pulsating stresses.

Equivalent maximum stress

If we let m equal the minimum stress in a member (plus for tension and minus for compression), M the maximum stress and M_E an equivalent maximum stress in a member, the value of which depends upon the minimum and maximum stresses, each taken with its appropriate algebraic sign, substitution in Eq. 1 gives

$$S_r = S_{-1}\frac{\frac{m}{M}+3}{2} \qquad (2)$$

The sectional area required in the member is

$$A = \frac{M}{\frac{\frac{m}{M}+3}{2}S_{-1}} = \frac{2M^2}{S_{-1}(m+3M)} \qquad (3)$$

If $AS_{-1} = M_E$, then

$$M_E = \frac{2M^2}{m+3M} \qquad (4)$$

and

$$A = \frac{M_E}{S_{-1}} \qquad (5)$$

The following tabulation give some examples of the application of Eq. 4:

Values of m	Values of M	Values of M_E from Eq. 4
— 100,000	+ 100,000	100,000
— 50,000	+ 100,000	80,000
0	+ 100,000	66,667
+ 50,000	+ 100,000	57,143
+ 100,000	+ 100,000	50,000

The sectional areas required for such combinations of stress are found by dividing the values of the equivalent maximum stress, M_E, by the appropriate unit stress, S_{-1}, for fully reversed stresses.

Thus far the unit stress S_{-1} is the endurance-limit unit stress for fully reversed stresses. S_{-1} should be divided by a factor of safety in order to obtain a safe working basic unit stress.

Working unit stresses

A study of available tests indicates that the following basic unit stresses for fully reversed stresses may safely be applied to A.S.T.M. steel for bridges, and to welds made from weld metal, which, in a deposited specimen will yield an ultimate tensile strength of not less than 60,000 lb. per sq.in., and an elongation of not less than 20 per cent., obtained from standard ½-in.-diameter specimens with a gage length of 2 in. Such weld metal may be designated as ductile weld metal.

Material	Unit Stress S_{-1} Lb. per Sq.In.
Main material in tension or in short compression members	12,000
Main material, shear	9,000
Main material where connected by fillet welds	8,000
Butt welds in tension or compression	9,000
Butt welds in shear	6,000
Fillet welds in shear	4,500

TABLE I—REQUIRED MAIN MATERIAL

Formula No.	Type of Member	Kind of Stress	Formula
1	Tension flanges of beams and girders	Bending	$\frac{I}{C} = \frac{M_E(\text{Mom.})}{12{,}000}$ but not less than $\frac{\text{Max.(Mom.)}}{18{,}000}$
2	Compression flanges of beams and girders	Bending	$\frac{I}{C} = \frac{M_E(\text{Mom.})}{12{,}000 - 3\frac{1}{2}\left(\frac{l}{b}\right)^2}$ but not less than $\frac{\text{Max. (Mom.)}}{18{,}000 - 5\left(\frac{l}{b}\right)^2}$ In which l = the unsupported length, and b = the width of the flange
3	Axially stressed but not connected by fillet-welding	Tension	$A = \frac{M_E}{12{,}000}$ but not less than $\frac{\text{Max.}}{18{,}000}$
4	Axially stressed but not connected by fillet-welding	Compression	$A = \frac{M_E}{10{,}000 - \frac{1}{6}\left(\frac{l}{r}\right)^2}$ but not less than $\frac{\text{Max.}}{15{,}000 - \frac{1}{4}\left(\frac{l}{r}\right)^2}$ In which l = the unsupported length, and r = the least radius of gyration
5	Axially stressed and connected by fillet-welding	Tension	$A = \frac{M_E}{8{,}000}$ but not less than $\frac{\text{Max.}}{15{,}000}$
6	Axially stressed and connected by fillet-welding	Compression	$A = \frac{M_E}{8{,}000}$ but not less than $\frac{M_E}{10{,}000 - \frac{1}{6}\left(\frac{l}{r}\right)^2}$ and not less than $\frac{\text{Max.}}{15{,}000 - \frac{1}{4}\left(\frac{l}{r}\right)^2}$

These unit stresses provide for a factor of safety of about 1.45, based upon the endurance limits of the main material and those of the various kinds of welds. Some authorities are satisfied with a factor of safety of about 1.30.

The following unit stresses may be used for weld metal, which, in a deposited specimen, will yield an ultimate tensile strength of not less than 50,000 lb. per sq.in., and an elongation of not less than 7 per cent. Such weld metal may be designated as low-ductility weld metal.

Material	Unit Stress S_{-1} Lb. per Sq.In.
Butt welds in tension or compression	6,000
Butt welds in shear	4,000
Fillet welds in shear	3,000

This method of designing the main members and their welded connections can be reduced to a few articles for use in specifications as follows:

A. Stresses—Maximum and minimum stresses (axial, bending, shear, etc.) shall be calculated in accordance with the requirements of the applicable general specifications. These stresses will be designated as Max. and Min., respectively, and their algebraic signs will be assumed as plus for tension and minus for compression.

B. Equivalent Maximum Stresses—An equivalent maximum stress, M_E, shall be calculated for each member from the formula

$$M_E = \frac{2(\text{Max.})^2}{\pm\ \text{Min.} + 3(\text{Max.})}$$

C. Required Main Material—The required area of the main material shall be calculated in accordance with formulas 1 to 6 in Table I, in which

$\frac{I}{C}$ = the required section modulus for beams and girders (gross areas in the absence of rivet or bolt holes).

A = the required sectional area (gross section of tension members in the absence of rivet or bolt holes).

D. Areas Required in Welds—The areas required in welds shall be calculated in accordance with formulas 7 to 9 in Table II.

A = the throat dimension of the weld times its effective length.

TABLE II—AREAS REQUIRED IN WELDS

Formula No.	Type of Weld	Kind of Stress	Ductile Filler Metal	Low-Ductility Filler Metal
7	Butt	Tension or compression	$A = \frac{M_E}{9{,}000}$ but not less than $\frac{\text{Max.}}{16{,}000}$	$A = \frac{M_E}{6{,}000}$
8	Butt	Shear	$A = \frac{M_E}{6{,}000}$	$A = \frac{M_E}{4{,}000}$
9	Fillet	Tension, compression or shear	$A = \frac{M_E}{4{,}500}$	$A = \frac{M_E}{3{,}000}$

E. Design of Butt Welds—Formulas 7 and 8 are based upon the assumption that there are no abrupt changes of stress distribution adjacent to the welds, that only normal reinforcement of the welds is used, and that the parts are arranged and held, at the time of welding, in such a way that the weld metal can contract with practically entire freedom.

F. Design of Fillet Welds—"By specia design of fillet-welded splices and end con nections, proven by tests to alleviate or re move the susceptibility to fatigue failure o the base material adjacent to the ends of the fillets, the area of the base material required by formulas 5 and 6 may be reduced, the limit being the area required by Formulas 3 and 4, respectively."

Cost of Bonneville Power to Northwestern Communities

Use of existing facilities favored by Oregon State Planning Board in a survey of probable cost of generating and distributing Bonneville power to various communities—TVA plan of allocating distribution cost held undesirable

THE tying in of Bonneville power to existing transmission facilities of operating company systems in Portland, Vancouver and other communities of the Northwest and to the Condit plant of the Northwestern Electric Co. on the White Salmon River is advocated in a report on the federal power development by the Oregon State Planning Board published on Jan. 6. The report makes certain assumptions relative to the development of power at Bonneville and the absorption of this power in the tributary transmission area, and finds minimum costs, including generation and transmission, of energy delivered at 51 substations.

Basis of conclusions

It was pointed out that the data and conclusions are "based on admittedly hypothetical and optimistic assumptions as to the growth and distribution of power requirements. In their very nature, therefore, they do represent the least possible price at which power could be delivered to the substations, unless some further reduction of the charges against power (in addition to that of navigation assuming part of the capital cost) is forthcoming. The actual cost of substation deliveries will very likely be greater than set up. . . ."

These costs, however, are stated to represent the probable minimum at which power can be delivered to the receiving substations unless some further subsidy is provided by the federal government in addition to that of navigation assuming part of the capital cost. The findings are held out as an answer to the inquiry of outlying communities and utilities as to whether they should proceed to develop local power resources or wait for power to be supplied from Bonneville.

Generating costs that are based on these assumptions run from 2.57 mills for the Portland area with a demand of over 190,000 kw. to 4.67 mills for the city of Burns with a demand of 560 kw. These were obtained by assuming that the total salable output of the ultimate capacity at Bonneville is 432,000 kw., which will be distributed to 51 substations within fifteen years from the start of operations. This contemplates the ultimate absorption of 2½ billion kw.-hr., or more than twice the volume generated in the territory during the maximum year on record. These substations are located mostly within a 200-mile radius of the Bonneville project. Transmission lines, at 33,000 to 110,000 volts, depending upon the size of the load and the distance transmitted, are assumed to reach these points.

The annual costs charged to the generation of power are made up as follows: amortization of the capital cost over a period of 50 years; 4 per cent interest on the capital cost ($46,000,000); a replacement fund set up each year to restore equipment that may become obsolete before the expiration of the amortization period; maintenance and operation; carrying costs of the unused generating facilities over the fifteen-year load-absorption period.

A further assumption is that half the cost of the dam, fishway and reservoir, and all the cost of ship locks, amounting to nearly $19,000,000, are charged to navigation. This allocation of the initial cost of the project, plus an estimated amount for the ultimate installation of ten units of 43,200 kw. each, brings the total cost to approximately $46,000,000.

Capital cost of the transmission system reaching the 51 stations is estimated at $43,270,000. This includes 1,900 miles of line of varying voltages, all of wood-pole construction except 100 miles of main line, where steel towers are contemplated.

Another assumption is the prorated distribution of the power to each of the receiving stations in proportion to the present use within the area tributary to each. The sum of the estimated demand kilowatts is 525,000, but the report points out that there will be a diversity of demand between substations. Use of power at these points is figured on a 40 per cent load-factor basis.

A schedule for firm power at the high side of the step-up transformers at the plant is assumed not for rate making but for producing sufficient revenue to meet the obligations imposed by the other assumptions. This schedule will produce average costs of generation for various demands, based on 730 hours per month, as follows:

Demand Kw.	Mills per Kw.-Hr. 40 Per Cent Load Factor	Mills per Kw.-Hr. 60 Per Cent Load Factor
100	5.055	4.370
1,000	4.397	3.284
5,000	3.171	2.279
10,000	2.863	2.075
25,000	2.678	1.952
50,000	2.616	1.911
75,000	2.596	1.898
100,000	2.586	1.891

In figuring the transmission costs that must be added to generation cost in order to find the cost of the low side of the substation, two theories were employed. In one plan each substation is assumed to carry its proportionate share of the capital cost of the transmission system as well as its share of the annual charges, the allocation to substations being based on their peak demands and their relative distances from the point of generation.

This distribution produces widely varying transmission costs ranging from 1.07 mills in Portland to 3.781 cents in Burns, farthest point from the plant and having one of the lowest demands. Under the other plan, embodying the theory employed by the Tennessee Valley Authority, the capital and annual costs of the transmission system within the entire territory have been lumped and the resulting unit cost per kw.-hr. is applied equally to all points in the territory. This unit cost is 2.57 mills per kw.-hr. The effect of this method is to subsidize the outlying and low-demand districts at the expense of the nearer and larger power-consuming points.

Comparative costs

Illustrating the effect of these plans of cost allocation in different localities, the report points out that under the second plan the cost of delivered energy at Portland would be 40 per cent higher than under the first plan. Since distribution costs, which are not included in the analysis, represent the greater part of the total cost to the ordinary customer, his cost is not increased in any manner commensurate with the increase noted in cost of delivery to the substation.

Comparative costs of electric energy,

SUBSTATION	COST OF DELIVERED ENERGY PER KW.-HR. (Mills) Generation	Transmission	Total
Portland	2.57	1.07	3.64
	2.57	2.57	5.14
Salem	2.64	1.56	4.20
	2.64	2.57	5.21
Eugene	2.76	2.46	5.22
	2.76	2.57	5.33
Klamath Falls	2.66	4.39	7.03
	2.66	2.57	5.23
The Dallas	3.17	2.74	5.91
	3.17	2.57	5.74
Pendleton	3.35	4.16	7.51
	3.35	2.57	5.92
Vale	3.46	10.29	13.75
	3.46	2.57	6.03
Burns	4.67	37.81	42.48
	4.67	2.57	7.24
Astoria	2.84	3.55	6.39
	2.84	2.57	5.41
St. Helens	2.76	2.64	5.40
	2.76	2.57	5.33

based on a 40 per cent load factor with capital and transmission costs proportioned to demand and distance from Bonneville, are shown in the accompanying table with figures for Plan I appearing above those for Plan II, in each instance.

The over-all cost for the residential consumer in Portland would be about 7 per cent higher under the second plan than under the first plan. In the case of a large industrial plant with a high load factor, however, in which the distribution cost is a comparatively negligible item, the report stated that the increase might run as high as 35 per cent, or $19.50 per kilowatt-year in Portland under the second plan, as against $14.25 under the first, which, the planning board holds, would be a serious handicap to large power-using industries that might otherwise be attracted to the region by cheap Bonneville power.

Other generating costs

As a guide to communities considering the problem of purchasing Bonneville power when it is available or of utilizing the generating facilities in their own regions, the report discusses generating costs by steam, diesel power and hydro-electric power in general terms, placing the cost of generation by steam at from 4.5 to 7 mills, diesel at 7 to 12 mills, and hydro power at 2 to 5 mills.

The report concludes that if the federal government follows a policy of constructing the main transmission lines where economically justified, the problem before the local interests is the distribution of power from the main receiving substations to the point of use. This, in practically all localities, can be accomplished most economically by making full use of existing secondary transmission and distribution facilities and gradually extending them as required.

Any duplication of existing facilities, as long as they are adequate to serve the load, is held to be an economic waste.

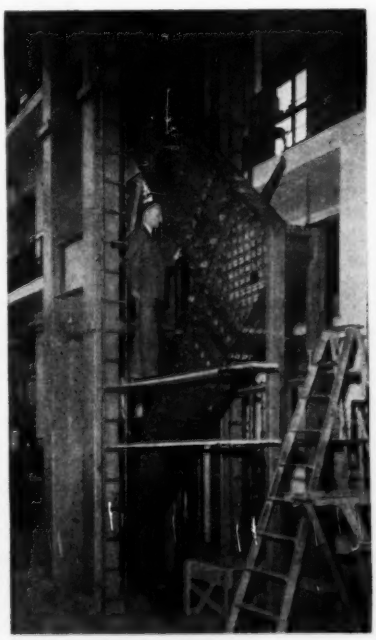
Members of the State Planning Board's advisory committee on power, which submitted the report, are: J. C. Stevens, chairman, Stevens & Koon, consulting engineers; R. H. Dearborn, dean of engineering, Oregon State College; Arthur J. Farmer, Portland Chamber of Commerce; C. I. Grimm, U. S. Engineer Department; J. W. McArthur, Eugene Water Board; F. R. Schanck, consulting engineer; George H. Wisting, Northwestern Electric Co.; and V. B. Stanbery, National Resources Committee.

The report was prepared from data furnished by the office of the North Pacific Division, Corps of Engineers, of which Col. T. M. Robins is division engineer.

Stress Behavior in Steel Rigid Frames Sought in Research Program

TESTING of large-size steel rigid frames is under way at the Bureau of Standards in Washington in an effort to determine the stress distribution in and around the knee sections. The neutral axis or plane of zero stress in a curved beam does not coincide with the gravity axis nor is it possible to determine its deviation by present analytical methods. It was decided by the American Institute of Steel Construction that experimental studies of the problem were necessary to establish a scientific basis for rigid-frame design, and the present cooperative research program is the result of this decision.

Test specimen No. 1, now under study, is made with an angular intersection of the leg and beam. Test specimen No. 2 will be similar except that the inner flange at the knee will be curved. Arrangements are being completed to procure a fully-welded test specimen for a third series of tests to be made later.



STEEL RIGID-FRAME MEMBER set up for testing at the Bureau of Standards.

Since both the extent and influence of stresses in the outer corner of the knee are in question, both specimens 1 and 2 have outer-corner reinforcement bolted in position, so that duplicate tests can be made with and without such reinforcement. The present tests are described as pilot tests whose principal objective is to trace the plane of zero stress from one leg around the knee to the other leg, and to confirm this by observation of extreme-fiber stresses within the yield point of the material. It is hoped that by determining the stress condition quite generally over the web plate, supplemented by observations on transverse deflections of the web, the most effective system of web stiffening can be found.

After the pilot tests are completed, it is possible that study will be made of a specimen built as a scale model of a preconceived prototype designed and analyzed in accordance with the inferences from the tests on the pilot specimens.

In the tests on Specimen 1, stresses in the web were measured at 232 points; at each of these points the stress in four directions 45 deg. apart were measured on 2-in. gage length. From these point measurements the principal stresses and the shear (half the difference between the principal stresses) were computed. The plotted contours of principal stress are shown in a progress report just published by the American Institute of Steel Construction with the bureau's official statement.

In the plot of principal stresses the maximum tension (12,000 lb. per sq.in.) is shown to lie well inward of the outer corner of the knee; halfway from this point of maximum stress to the outer corner the tension is only 6,000 lb. per sq.in. At the inner corner the maximum compression reaches 18,000 lb. per sq.in. The shear in the web reaches 10,000 lb. per sq.in. over the central part of the corner panel of plate.

Sanitary-Fill Refuse Disposal at San Francisco

After three years' experience in disposal of 500 to 700 tons daily, a franchise has been granted for ten-year continuation of present methods on waterfront site

SINCE OCTOBER, 1932, San Francisco's garbage and refuse has been placed in a sanitary fill on tidelands of San Francisco Bay adjacent to the city's southern boundary. The methods and equipment used for the first six to twelve months naturally were experimental, because there was no information at hand on similar operations handling as much as the 500 to 700 tons daily which this city produces. Early difficulties included sloughing of the fill with resultant liberation of noxious gases; troublesome road maintenance in wet weather and interruptions caused by tides and storms.

Later, when there was a better understanding of causes, all these difficulties were overcome; methods were improved and equipment suitable to the work was provided. After these modifications and in its present form the sanitary fill has been accepted as the most satisfactory method of refuse disposal yet proposed. Accordingly, a franchise was granted recently continuing the present disposal plan for a period of ten years. Previous reference to progress in the development of this plan appeared in *Engineering News-Record*, Oct. 18, 1934, p. 501. The following presents an outline of methods developed and experience in operation of the fill.

Collecting and loading into gondolas

Garbage collection in San Francisco is done by private scavenger companies hauling to a central loading ramp in an industrial district, where each truckload is weighed before it is dumped into flat-bottom gondola cars of 2,000-cu.ft. capacity. San Francisco has always had the single garbage-can system. Because natural gas is used extensively throughout the city, the percentage of ashes is very low even in winter and the danger of fire at the loading plant is correspondingly small. However, the refuse is well hosed while the gondolas are being loaded. This settles dust and by wetting the papers aids in compacting the load and prevents scattering material along the railroad.

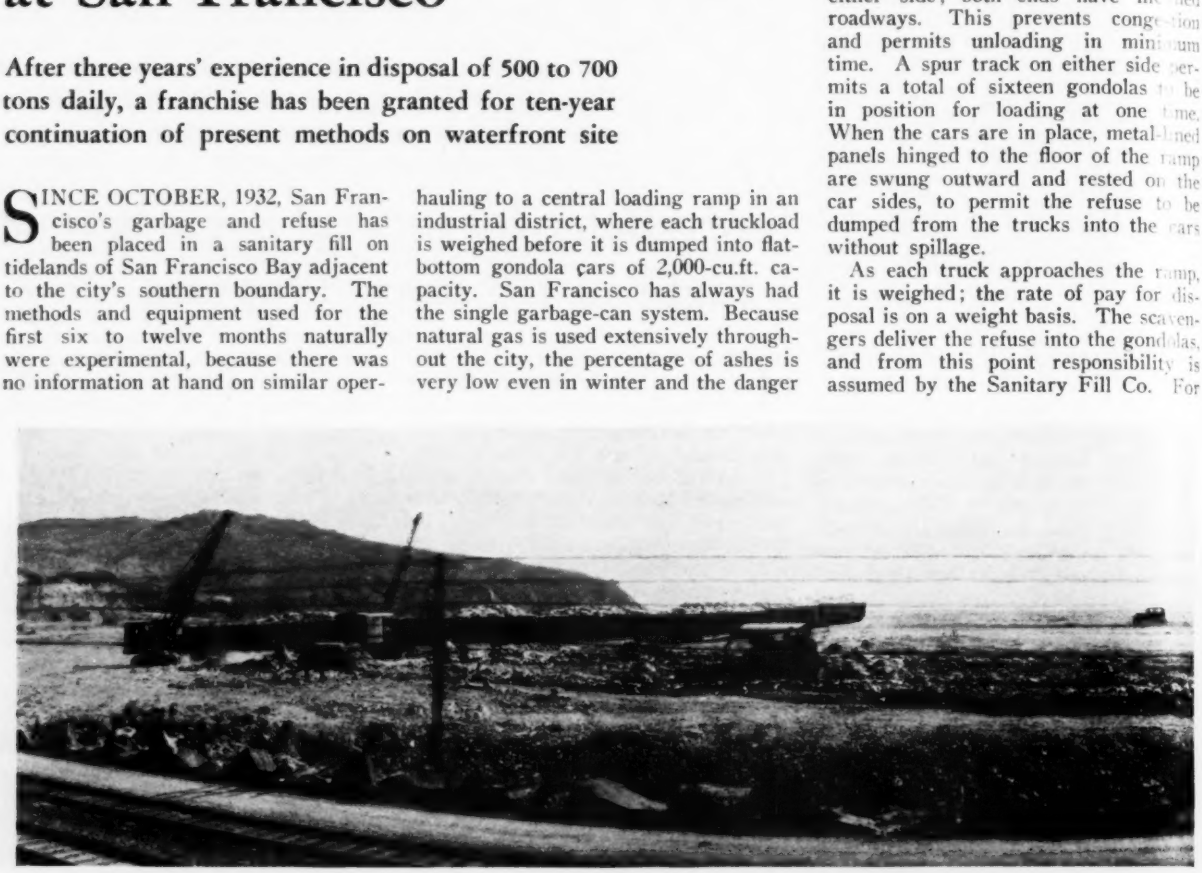


FIG. 1—UNLOADING CRANES and tractors in operation. Here the fill is being raised in successive lifts. The bulldozers spread the unloaded refuse preparatory to placing the cover of earth. Material for the cover comes from the excavation in the hill in the left background.

The only salvage operation is during collection when bottles, wire and some metal valuable as junk are sorted out by the scavengers themselves. Hotels, restaurants and large boarding houses keep kitchen and table wastes out of the garbage cans, because they find it profitable to separate this material and sell it privately to hog raisers. Paper from industrial establishments also is sold privately to a large extent; however, waste-paper salvage varies with the demand for fiberboard. Under these conditions of collection the total quantity from a tributary population of about 750,000 is 20 to 25 gondola cars per day.

To meet these requirements, a loading ramp was built with a deck 380 ft. long and 16 ft. above track level. The width is sufficient to permit trucks to maneuver so they can back to the edge on either side; both ends have inclined roadways. This prevents congestion and permits unloading in minimum time. A spur track on either side permits a total of sixteen gondolas to be in position for loading at one time. When the cars are in place, metal-lined panels hinged to the floor of the ramp are swung outward and rested on the car sides, to permit the refuse to be dumped from the trucks into the cars without spillage.

As each truck approaches the ramp, it is weighed; the rate of pay for disposal is on a weight basis. The scavengers deliver the refuse into the gondolas, and from this point responsibility is assumed by the Sanitary Fill Co. For disposing of the refuse the scavengers pay $1 per ton to the Sanitary Fill Co., which in December, 1935, was given a franchise to continue operations on the present plan for a period of ten years. A provision of this franchise is that the company shall maintain a $50,000 bond guaranteeing to perform its work in conformity with requirements of the city's board of health. The entire cost of collection and disposal has to come out of the monthly fees paid by householders and others from whom the private scavengers collect. These rates are based on quantity of garbage and range upward from a minimum of 50c. per month for weekly collections.

The crew employed at the ramp by the Sanitary Fill Co. consists of nine men, including foreman and a night watchman. Their duties are to operate the side panels, trim the loads in the gondolas, hose down the refuse as it is being loaded and keep the ramp and surrounding yard clean. The ramp is within 1,000 ft. of the waterfront, where rodent risk would be high if strict sanitary precautions were not observed.

Scavengers' trucks deliver at the ramp throughout most of the day. At 5 p.m.

the loaded gondolas are replaced by empties to await refuse of the following day. The train of loaded cars is hauled in the early morning hours to the sanitary fill, a distance of about 4½ miles. This is within the switching limits; the cost for rail haulage is $3.96 per car.

Unloading and placing

When the fill was first started, side-dump cars were used and refuse had to be unloaded into trucks that conveyed it to the edge of the fill. This was a troublesome and expensive method; it was discontinued as soon as the fill had progressed enough to permit the use of a circular or balloon track. Successive improvement developed the unloading and placing process to the point where the operation is done entirely by grab buckets unloading from gondolas and leaving material on the ground where it can be spread by bulldozers. Cover material is brought in by dump trucks.

The daily sequence of operation on the fill is as follows: at 7 a.m. two dragline cranes mounted on crawlers and using 1½-cu.yd. straight-lipped buckets commence unloading two adjacent gondola cars. A 60-hp. tractor equipped with an extra large bulldozer blade shoves the refuse to the edge of the fill. About two hours later a 35-hp. tractor with standard blade goes into service, trimming the fill and aiding the larger tractor. Each crane unloads along a distance of 50 ft. (the length of one car). The cranes remain in practically this same position. As each pair of cars is unloaded, the train is advanced two car-lengths by the larger tractor.

The cranes stand on the same level as the track, and a helper or spotter is stationed in each car as it is being unloaded. He directs placement of the bucket by signal, and when the car is unloaded he sweeps up remaining refuse with a stiff broom and shovels out the small amount which the clamshell is unable to gather. Good crane operators after a few weeks' practice unload one of these cars in 25 min., including necessary delays and spotting of cars. Thus unloading the daily delivery of 20 to 25 cars, which begins at 7 a.m., is completed sometime between noon and 2 or 3 p.m. After unloading is finished, the two car spotters with the help of the bulldozers clean up around the track. The 60-hp. bulldozer then is through for the day; the lighter tractor remains for trimming up the pile of refuse and spreading the earth cover.

The 1½-cu.yd. clamshell buckets used for unloading are of standard shallow-depth design, weighing about 5,000 lb. As the weight of the refuse is only 650 to 700 lb. per cu.yd., the load is quite light as compared to the 2½-ton buckets. Lighter buckets, however, are not satisfactory, because in order to make time in unloading, the cranemen drop their buckets on the swing. This battering has made it desirable to reinforce the arms, corners and other points of weakness on the bucket. The time gained is believed to more than offset the cost of using the heavier equipment.

The best way to keep the gondolas clean, it was found, is to brush them out with a stiff broom after unloading. The refuse contains much absorbent material such as paper and relatively little wet garbage. Hence the inside of the empty car is normally dry, and the brushing cleans it while retaining the desirable dry condition.

FIG. 2—LOOKING ACROSS the fill from a water tank at the shore end of the fill. Gondola cars in the right background are about 1,500 ft. distant from the camera. The maintenance shop and fill office are in the central foreground. At the left is the excavation from which the cover material is obtained.

Managing a fill on mud

At the first of this year the area of fill brought up to established grade was approximtaely 36 acres. An addition of 0.8 acre is being added each month; it is thought that this rate may decrease as the water gets deeper. The established grade after settlement is to be the same as that of the adjoining railroad yard, which is 12½ ft. above mean lower low-water. The fill is being made on tidelands owned by the Southern Pacific Co.; compensation for the privilege granted to the city is in the land made by the fill. The area available is estimated to be ample for disposal of the city's refuse for at least 25 years.

While the fill was close to shore where mud depth was less than 8 ft., placement of new fill over the mud at low tide was simple. Now, with the face of the fill 1,500 ft. from shore in mud of greater depth, care is necessary to prevent the fill from breaking away and sliding forward to a point where it cannot be covered each day. Filling is now going on in water about 4 ft. deep at low tide. The tidal range is 8.2 ft.

To avoid losing refuse when spreading directly on the mud or in shallow water, operations have to be timed so the maximum load will be deposited on the new fill when the water depth is least. That is, it is preferable to advance the fill during low tide when there is the minimum buoyant effect. When the fill is so placed, the refuse continues to sink under the weight of tractor and trucks. If the fresh fill is placed during rising or high tide, the new material is temporarily sustained at a high level, and on the following low tide the fill settles so rapidly that it is likely to crack and break along the outer face. When such breaks occur, the only remedy is to wait a week or more until the detached mass has come to rest.

Because of the extremely soft mud at the site of this fill a new fill, properly handled, continues to sink slowly until there is a depth of 10 to 12 ft. of refuse below the mud line with only 3 or 4 ft. above. The program is to advance the filling on successive days progressively around the outer edge of the area being filled. Thus, several layers are successively superimposed until the compacted refuse and earth cover extend probably 20 ft. below the mud line before reaching a bottom sufficiently firm to support the weight of the fill up to its final height of 18 to 20 ft. above mean lower

low-water. Within the six to eight months after completion to this height the fill compacts 20 to 25 per cent. Thereafter the settlement is slower, and in the ensuing two years does not exceed 15 to 20 per cent of the remaining depth. Apparently, different conditions obtain within the fill during this initial period of rapid settlement and the later slower rate.

Recently it has been observed that as the fill advances into deeper water an extensive mud wave has been moving ahead of the fill. At low water it can be seen about 6 to 8 ft. above original mud level. If this mud wave continues and increases in height, it should greatly aid the operation by making it unnecessary to place waste directly in the water at high tide, thus making the counterbalancing action of the mud nearly constant rather than subject to the present tidal variations. If the wave reaches high-water level, necessity for working on a tide schedule will cease and the fill can be advanced at any hour or season.

About 350 ft. is the maximum distance that refuse can be bulldozed efficiently. Accordingly, after the fill has been built up so that it will sustain itself above high-water level for a distance of some 350 ft. ahead of the balloon track, the filling is continued in successive layers or lifts which slope downward from the track so the bulldozers continually work downgrade. The final lift is finished off with its surface sloping up from the track on a grade of 2½ to 3½ per cent, so that when the track is advanced to the new position the expected settlement ultimately will bring it down to finished grade level. The building of this final upgrade puts the greatest load on the bulldozers.

Earth-cover operations

A hill adjacent to the site supplies earth and rock for fill and for making roads which will stand up under the heavy truck service during the wet season. Part of the hill can be worked without blasting, although most of the ground needs to be shaken; occasionally strata of comparatively hard rock are encountered. Blasting costs are comparatively high because dwellings, some of which are only 300 ft. away, necessitate relatively small charges. Black powder is used, about six cans to a hole 20 ft. deep.

The blasting shakes up the ground sufficiently so the shovel can dig with the upper portion caving down as work progresses. The earth output per day varies from 500 to 1,000 cu.yd. (loose measurement), depending upon the working schedule of the trucks. The average for 1935 was 748 cu.yd. of cover material per day. The shovel has a 1¼-cu.yd. dipper; it usually operates on a 40-hour weekly schedule and serves four 6-cu.yd. dump trucks.

FIG. 3—AN AERIAL VIEW of the 36-acre fill, showing refuse being bulldozed directly into the water. Gondola cars are being unloaded, and the remainder of the garbage train stands on the balloon track parallel to the main-line railroad tracks.

The average day's delivery of refuse will cover a 50x100-ft. area to a depth of 6 ft. In addition to the 2-ft. earth cover on each day's fill, the edges also must be covered so that the placement made each day is completely sealed on all sides. The refuse bulldozed into place at the edges of the fill will stand on a slope of about ½ to 1. The earth cover, on the other hand, has an angle of repose no steeper than 1 to 1 at best. Thus, the earth cover used in covering side slopes is estimated to total 65 or 70 per cent of the earth hauled to the fill. The weight of earth cover is about equal to the weight of refuse in the fill.

During most of the year a floating-log boom made of old 14x14-in. timbers 20 ft. long is anchored 200 to 300 ft. out from the edge of active portions of the fill to catch floating material that escapes from the refuse. Boom timbers are fastened together with chain or old cable, and pieces of rail or other scrap iron are used for anchors. Much was learned at the outset about maintaining this boom through the winter. Winter storms bring wind toward the fill across a long sweep of open water. Severe wave action repeatedly destroyed the boom and carried away refuse along the edge of the fill. However, for two seasons now it has been possible to program the work so that placement of refuse on the mud has been done during seasons when storm winds do not occur. Thus, after the first storm of winter has carried the boom ashore, it is pulled out and stored until the following February or March.

Track and equipment

At present there is about 4,200 ft. of railroad track on the fill. The portion of this from which the fill is advanced is laid out in a semi-circle about 850 ft. long between parallel tangents. The present dimensions of the fill, roughly, are 1,100 ft. in width by 1,700 ft. in length. The time of year when the semi-circular portion of the track is shifted and the amount of the shift are carefully coordinated with the period during which it is desirable to place fresh fill on the mud while the boom is in place. Track shifts range from 50 to 225 ft. To minimize cost in moving track, which becomes quite firmly embedded in the ground as the result of compaction of dirt over the ties, it is desirable to shift the track as far as possible when it is moved. About 175 ft. has been found to be the most practical shift. Although the shifts of 225 ft. are quite satisfactory from the shifting standpoint, there is a disadvantage in having to bulldoze the final layer of fill uphill for this distance in advance of the track.

Because the outer portion of recently completed fill is carried 6 to 8 ft. higher than the established grade at which it is estimated that the fill will finally come to rest, the cross-sectional shape of the deposited material is such that it drains toward the center. This has necessitated the maintenance of a drainage ditch to carry water from this point into the bay.

Equipment used daily on the fill and spare units kept on hand to avoid interruptions in case of breakdown are maintained by a fully equipped machine shop on the fill, where two mechanics and two helpers are on duty daily. The scavengers deliver refuse to the cars at the ramp every day in the year except Sunday and three holidays. Franchise and permit requirements state that all

TABLE I—EQUIPMENT MAINTAINED AT THE SANITARY FILL

Daily in Service	Spare Equipment	Other Equipment
2—¾-cu.yd. dragline cranes (convertible to shovels)	1—¾-cu.yd. dragline crane	1—140-cu.ft. compressor
1—1¼-cu.yd. shovel	1—60-hp. tractor bulldozer	1—Jackhammer
1—60-hp. tractor bulldozer	1—30-hp. tractor bulldozer	1—12-ton road roller
1—35-hp. tractor bulldozer	2—6 cu.yd. dump trucks	1—road grader
4—6-cu.yd. dump trucks		1—gas and oil truck
		1—1½-ton truck

refuse be unloaded daily and completely covered each day. Delay of one day in unloading the cars would seriously tie up the work and immediately affect delivery of truck collections arriving at the ramp. The presence of spare equipment, aside from being available for immediate replacement in case of breakdown, permits thorough and constant overhauling of all pieces so they are kept in good condition. The total number of men employed at the fill is 22, including superintendent and night watchman.

Rodent control and fire hazard

Although rats formerly infested the inner portion of the cove where the fill is located and there is considerable backwash from sewage in this locality, the rats have disappeared as the fill has advanced. As all refuse is covered daily with a layer of earth and the surface is kept smooth and clean, there is no place for the rats to find shelter. Inspectors of the Board of Health and other officials report that they have seen no rodents on the fill. Similarly, the specified treatment of refuse with spray to keep down risk of fly propagation has not been necessary, as the filling methods afford no opportunity for flies to breed.

The fill is not considered a fire hazard for three reasons:

1. Each day's refuse is completely sealed daily on top and sides by a blanket of earth, generally damp.

2. The refuse is well hosed down during loading in the cars, and it becomes saturated with water vapor after being covered for several days. This vapor penetrates the entire mass as fermentation and temperature increase take place. Test holes show that the temperature of the mass does not exceed 115 deg. F.

3. The fill, being sealed on all sides, cannot maintain combustion, because the necessary oxygen can find no access to the refuse.

No fires whatever are allowed on the fill. Fires have started several times at the outer edges of the fill either as the result of smoker's carelessness or by deliberate action. These fires have been put out without difficulty by blanketing them with earth; in some instances a blaze has been extinguished effectively by covering it with a layer of the refuse itself. These fires do not burn the refuse, but are supported by an odorless gas believed to be methane which comes up from considerable depths and escapes at the face of the fill.

In all cases of the gas fires, which have occurred without exception on the face or forward edge of the fill, it was evident that the air necessary for combustion was coming in from the lower portion of the steep slope of the lift. This combustion generally has occurred among large rocks; it produces a hot but absolutely colorless flame. About half a dozen such gas fires have occurred during the past three years, but they always have been extinguished without difficulty. There has been no evidence of escaping gas nor any combustion on the level or finished area of completed fill.

Essentials to success in an operation such as this one are believed to be a convenient supply of cover material satisfactory in quantity and quality and a location for the fill such that seepage from it will flow directly into a large body of water. During the rainy season a certain amount of stormwater seeps through the cover material and, passing through the refuse, results in a leaching of the fermented and partly decayed organic substances. At extremely low tides during the winter a black liquid occasionally is observed seeping outward from the lower portion of the fill. This seepage has an exceedingly disagreeable odor. Fortunately it creates no nuisance, because it flows almost immediately into the bay waters.

Aside from the effective disposal of city waste, this sanitary fill is transforming tide flats into valuable property; the area of the actual fill itself is supplemented by the area from which the cover material is excavated in the adjoining hill. The "made" area thus developed will have value for industrial sites. It is to be noted that the amount of investment required for disposal of this sort is relatively very small.

This method of disposing of San Francisco's garbage has been developed under the direction of Alfred J. Cleary, San Francisco's chief administrative officer. John J. Casey is city engineer.

Sawdust on Fresh Concrete for Curing Pavement in Oregon

THE READINESS with which sawdust absorbs moisture and the abundance and low cost of this material in many Oregon communities have suggested its use as a substitute for earth to retain moisture over freshly laid concrete paving. The advantages of using sawdust are most pronounced in settled districts where the new pavement is bordered by curbs and sidewalks, and the earth shoulder material readily available in rural districts is not at hand. On paving jobs near lumber mills, sawdust can be delivered by large fuel trucks at a hauling charge less than that for earth or sand. Such trucks have a capacity of two or two and a half "units" per load. (A fuel "unit" is 200 cu.ft.). The Oregon State Highway Commission recently has cured concrete paving with sawdust on seven jobs and finds the method satisfactory in quality and cost.

Where sawdust curing is to be employed, the newly poured concrete is first covered with burlap, which is kept wet with water sprays for 16 to 24 hours. Immediately after removal of the burlap the sawdust is spread uniformly over the concrete surface to a thickness of 1½ to 3 in. Sawdust is delivered either in bulk at $2.75 per 200-cu.ft. unit or in sacks at $3.50 per unit. When delivered in bulk, the sawdust is dumped in piles alongside the pavement and is spread over the concrete with shovels or forks. When delivered in sacks, five sacks are left opposite each 10x15-ft. pavement panel and the sacks are emptied as required. Despite the higher price for the sacked material, the labor charge for spreading is low enough to make the cost in place less for the sacked material than for that delivered in bulk.

The sawdust is kept wet for the specified ten-day curing period. When no longer needed, it is permitted to dry out and is then gathered up and wasted at some suitable location. On one occasion where the pavement was laid in successive longitudinal strips 10 ft. wide, the same curing material was used for both strips. After the first strip was cured, the sawdust was thrown up in a windrow by a light truck and blade. Later, after about 20 per cent additional sawdust was added to make up the loss from handling and by wind, it was spread over the freshly placed strip adjoining.

Run-of-mill sawdust, used on six of the seven jobs, consisted of 90 per cent Douglas fir and 10 per cent hemlock, spruce and cedar. The one exception was pure cedar sawdust used on a short experimental section. All wet sawdust stained the surface of the concrete, but the discoloration had practically no penetration and completely disappeared 14 to 30 days after traffic began. The stain from the cedar sawdust was the heaviest. No damage to the concrete surface could be caused, it was believed, by the very small amount of organic acids present, which commonly become manifest only through oxidation in rotting or by distillation. Subsequent examinations are reported to have shown the concrete surface unaffected.

SAWDUST CURING COSTS
ON 19,684 SQ.YD. OF CONCRETE

Item	Total Cost	Cost Per Sq.Yd.
Sawdust, 70 200-cu.ft. units @$3.50	$245	$0.0124
Water, 46 days @ $2	92	0.0047
Labor, 836 man-hr. @ $0.50	418	0.0212
Supervision	35	0.0018
Burlap, hose, tools and misc.	76	0.0039
Truck rental, 45 hr. at $1	45	0.0023
Total	$911	$0.0463

Aluminum Stringer Failures Due to Fatigue Loading

Poorly placed ties on Smithfield Street Bridge in Pittsburgh concentrated loads on edge of outstanding legs of flanges, subjecting them to repeated stresses above the yield point

By Henry D. Johnson, Jr.
Chief Engineer, Department of Public Works, Pittsburgh, Pa.

FAULTY ERECTION of the street-railway ties and the failure to tighten a hanger bolt nut resulted in the breaking of the top flanges of some of the street-railway stringers and of one floorbeam on the Smithfield St. Bridge in Pittsburgh, Pa., whose floor system of structural aluminum represents the first major application of this material to a bridge (*ENR.*, Nov. 9 and 23, and Dec. 28, 1933). Visual examination of the breaks, eight in all, showed them to be typical fatigue failures, not associated with corrosion. Also, laboratory tests indicated that stresses of 50,000 lb. per sq.in. could be caused by this faulty erection of the ties—a stress greatly in excess of the specified yield point of the metal.

Since structural aluminum is a relatively new material, the department of public works of the city of Pittsburgh has carried out frequent inspections of this installation on the Smithfield Street Bridge. On the occasion of the first detailed inspection, in June, 1934, the floor was found to be in excellent condition with the paint coating intact and no evidence of corrosion. On the next inspection in August, 1935, carried out by the department of public works and by representatives of the Aluminum Company of America, the general condition of the bridge was again found to be good, but at eight locations in the top-flange angles of the railway stringers and at one location in the top-flange angles of a ma floorbeam breaks were discovered. Ea of the stringer failures was seen to ha been caused by a definite and obvio error in the placing of the cross-ti (Fig. 1).

The top-flange floorbeam fracture w caused by loose nuts of the U-bolt su porting the end of the floorbeam, per mitting the floorbeam reaction to b transmitted to the top flange of the bea through the frame which anchors th windbracing stringer to the hanger at that point. The failures of the stringer and of the floorbeam were repaired b adding plates the full width of the to flanges and of a length sufficient to accom modate enough rivets to develop th strength of the plate.

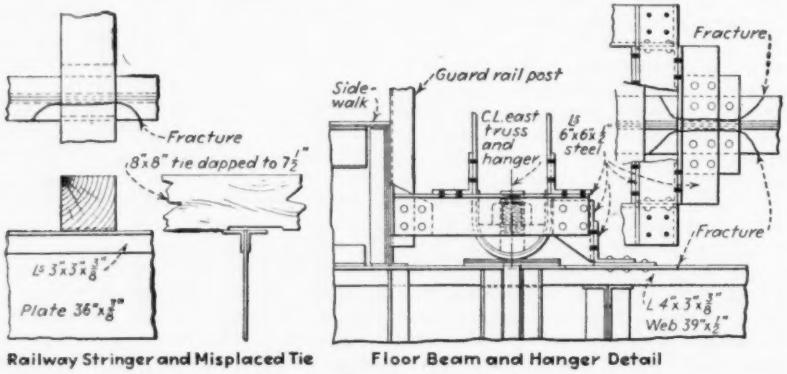


FIG. 1—LOCATIONS OF FRACTURES in aluminum-alloy stringers and a floorbeam of the railway deck of the Smithfield St. Bridge in Pittsburgh. Load concentrations from misplaced ties caused the stringer failures, while loose hanger bolts caused the fracture in the floorbeam.

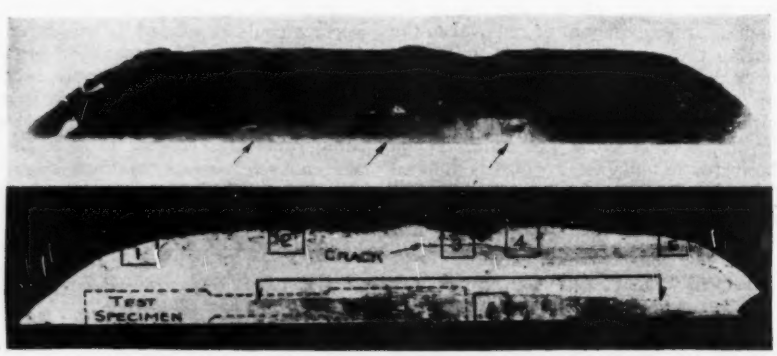


FIG. 2—CRACKED SECTION of a 3x3x⅜-in. stringer flange angle. In upper view, taken before dirt was removed, the arrows show where the ties rested improperly on the edge of the outstanding leg. In the lower view are indicated the locations of specimens cut out for microscopic examination and testing.

Microscopic examination

The broken portion of one of the stringer angles was removed for detailed examination. The upper view in Fig. 2 shows the condition of this sample before the accumulated dirt and paint had been removed. The irregular upper edge is the line along which the cracking occurred. The short edge at the extreme right was produced when the metal was intentionally broken in removing the specimen. The lower view shows the appearance of this same piece after the dirt and paint had been removed and indicates the location of the six specimens that were cut out for microscopic examination. Specimens 1 to 5 inclusive were taken so as to provide a cross-section through the crack. Specimen 6 was taken through the area where the railway tie rested. Results of the microscopic examination indicated that the microstructure was normal for aluminum alloy 27 S.T. Careful examination of the surface of the specimens showed that no corrosion attack of any nature had occurred.

In Fig. 2 there will be noted a crack parallel to the line of fracture and appearing as a thin dark line passing through specimens No. 3 and No. 4. This crack was part of the original service failure, and since the two parts of the break were not widely separated this crack was more convenient for microscopic examination than the areas where complete failure has occurred. Fig. 3 shows macrographs of the crack in specimen 3 and a portion of a branch of the crack at a higher magnification. These photographs show the joint of fracture in relation to the grain structure and indicate that the fracture was not inter-crystalline but rather trans-crystalline, following certain crystallographic planes. This type of fracture is characteristic of that which occurs when a metal fails in fatigue as a result of the action of repeated high stresses.

Stresses and mechanical properties

The mechanical properties of the material were determined by testing a specimen comprising the full thickness. As

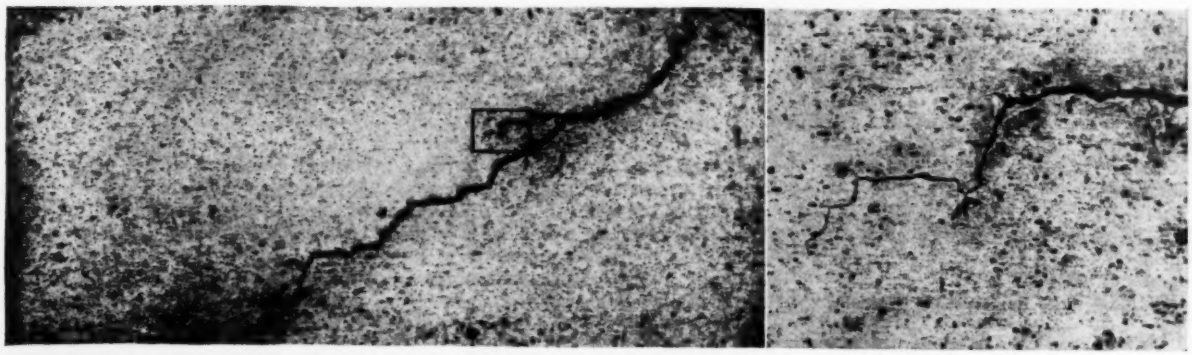


FIG. 3—MACROGRAPHS OF THE CRACK marked in specimen 3 of Fig. 2 showing the complete thickness of the metal. The view at the right shows the termination of a break of the crack at high magnification.

may be seen by the following tabulation, the values were above the specifications under which the material was supplied.

	Specif. Value	Test Value
Tensile strength (lb. per sq.in.)	58,000	61,250
Yield strength (lb. per sq.in.)	45,000	49,600
Elongation (per cent in 2 in.)	9	13.5

In some cases the failure consisted of a crack along the fillet of the flange angle. In other cases the failure had progressed to the point where the flange was fractured at about 45 deg. across the angle at one end of the crack. In still other cases the piece had dropped out, the fracture at both ends of the crack being at about 45 deg. It was observed that at these cracks the flanges were apparently straight and flat except when a streetcar passed, indicating that the deflection of the flanges at the cracks were apparently entirely elastic.

Since the cause of these fractures was obviously the uneven bearing of the dapped ties, it was desired to determine what actual stresses resulted from this condition of loading. Shims of varying thicknesses therefore were placed between the tie and free edge of the flange angles, and the deflections were measured relative to the position of the flanges, with the tie and the rail in service positions. The resulting measurements are charted in Fig. 4.

The measured deflections and computed stresses in the flange angles are related by the equation:

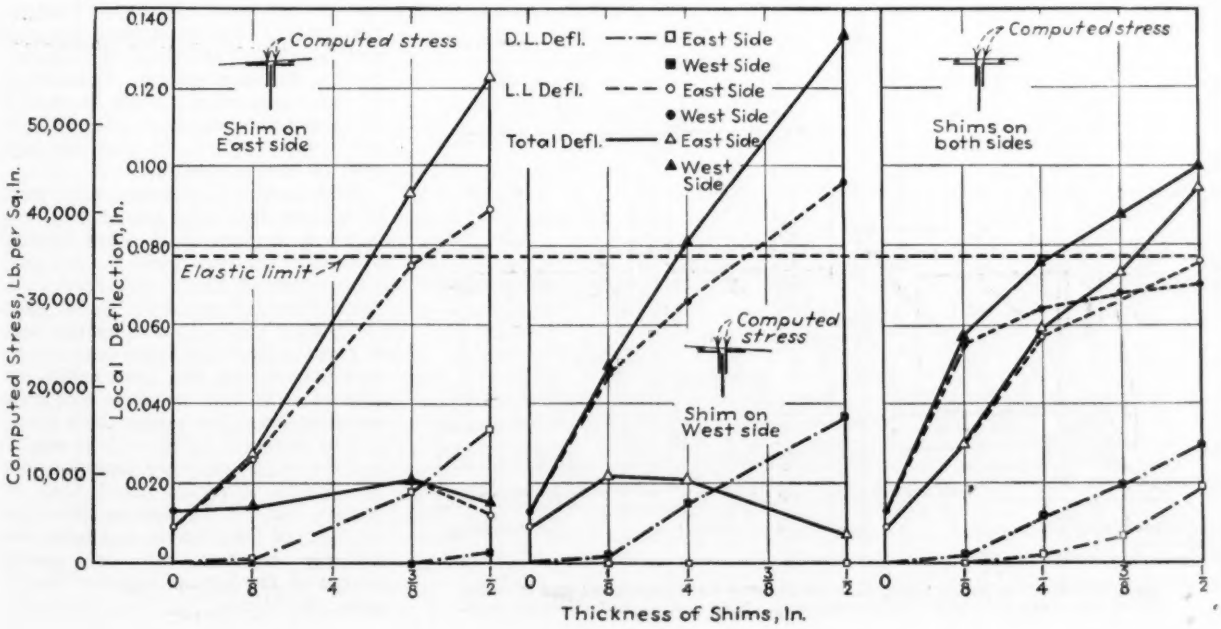
$$f = \frac{1.665\,DE_c}{L^2}$$

in which f is the computed stress at the heel of the angle, D the measured deflection of the edge of the angle, E the modulus of elasticity, c one-half the thickness of the angle, and L the distance from the center of bearing to the point of computed stress.

FIG. 4—LOCAL DEFLECTIONS and stresses of the flanges of the stringers under loading conditions simulating those caused by the misplaced dapped ties. The dead load consists of the rail and tie, the live load of 30- and 35-ton moving streetcars.

During the inspection a slight buckling of the stringer and a rotation of the top flange relative to the bottom flange were noted at the points where the ties were improperly placed. Examination of the consequent stresses indicated, however, that this rotation did not cause the failure but was only incidental to the flange deflections.

The department of public works of the city of Pittsburgh does not consider that these failures are any reflection upon the ability of structural aluminum to fulfill successfully the requirements of bridge construction, particularly so in view of the fact that in 1931 it was necessary to reinforce the steel stringers then on the bridge because of similar failures. It is known that at each point of failure there was a definite loading that exceeded the yield point of the material, and therefore failure could be expected. After two years of service the condition of the aluminum-alloy floor system of the Smithfield St. Bridge can be summarized as follows:



1. The mechanical condition of the aluminum members is good with the exception of the fracture of the stringer flange angles and the floorbeam angles, which have been repaired.

2. The field coats of aluminum paint show some deterioration at numerous points on the under side of the bridge, although the priming coat is in good condition.

3. There is no evidence of more than superficial surface corrosion of any aluminum alloy part.

4. There is no evidence of electrolytic corrosion or of corrosion at joints either between aluminum and aluminum, or between aluminum and steel.

The following employees of the Aluminum Company assisted the department of public works in the inspection: C. F. Nagel, Jr., E. H. Dix, Jr., B. J. Fletcher, M. Holt, R. L. Templin and R. I. Wray. The inspection and subsequent correction were carried out under the general direction of the writer with employees of the division of bridges and structures of the bureau of engineering, including H. S. Ayres and John J. Croak.

Two-130-Ft. Truss Spans Raised 7½ Ft. by Jacking Operation

By G. C. Olsen
Production Manager,
St. Joseph Structural Steel Co., St. Joseph, Mo.

NEED for additional waterway at a two-span bridge on U. S. Highway 166 over the Walnut River, near Arkansas City, Kan., was met by the Kansas state highway department by raising the two existing 130-ft. steel truss spans an average of 7½ in. and providing a third span of the same length and two 40-ft. deck girder approach spans. Economy as well as a desire to eliminate the hazard of falsework in the streambed were responsible for the decision to jack the old spans up from the existing substructure. The weight of each span, including the concrete floor slab, was estimated at 202.7 tons, about 50 tons per bearing. As the truss connections of end floorbeams were incapable of supporting the entire weight of a span and as the clearance between the lower chords and the tops of the piers was insufficient for entering the jacks, it was decided to use auxiliary jacking beams located directly over the end floorbeams.

Existing expansion devices, the concrete slab over the end floorbeams and the cabin coverplates were removed prior to erection of the jack beams. The latter were attached to floorbeams and truss cabins with four ¾-in. bolts at either end, after which thin shims were driven between the flanges of the two beams. Jacks were placed 2 ft. beyond the truss centers.

Stiffening angles in pairs were welded to the jack beams directly above jacks and the truss bearings. Angle braces, 3x3x¼ in., connecting the upper portion of the jack beam webs to the end posts of trusses, helped to fix the compression flange.

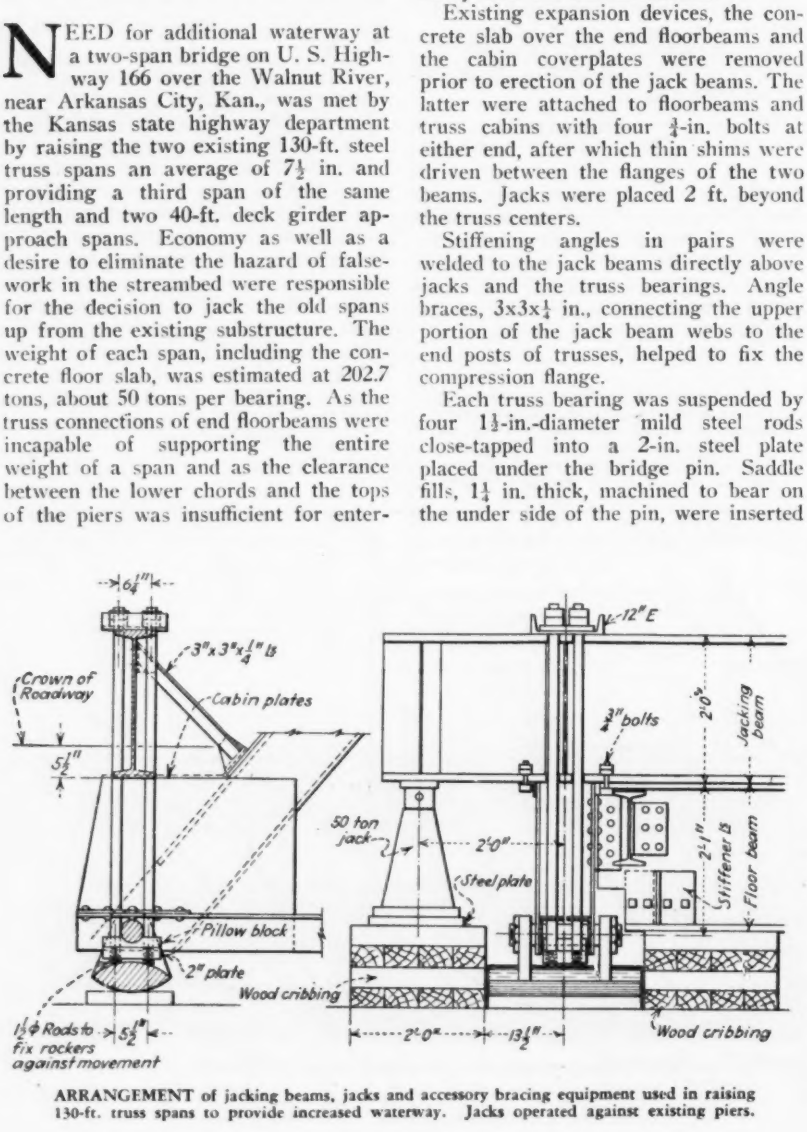
Each truss bearing was suspended by four 1½-in.-diameter mild steel rods close-tapped into a 2-in. steel plate placed under the bridge pin. Saddle fills, 1¼ in. thick, machined to bear on the under side of the pin, were inserted above the 2-in. plates. A short section of 12-in. channel with web reinforced by a ¾-in. plate was placed across the top flange of the jack beam to engage the suspension rods. Tight-drawn double nuts, tapped to a close fit, assisted in holding the beam webs vertical and insured contact with the floorbeam below, which was important as the weight of the span had to be carried by the two beams jointly while jacks were being lowered for a new lift. Yellow pine blocks 5¾x8 in. and 2½ ft. long, planed to a uniform thickness, were used for cribbing.

Four 50-ton hand-operated ratchet jacks with 7-ft. levers were used for lifting. The speed of operation was determined by the number of men who could find satisfactory hand hold on a lever; three men handled the job satisfactorily. The jacks had a maximum rise of 14 in. but were unstable when fully extended. After one or two experiments they were reset after each 5¾-in. lift by the thickness of a crib layer. One corner of each crib supporting a jack overhung both pier and abutment caps, necessitating careful construction to maintain outer crib faces vertical.

After the first span had been elevated about 5 ft., a longitudinal movement was observed away from the adjoining span. The extent of this was gaged by plumb bobs suspended through anchor-bolt holes in the bearing castings, the anchor bolts left in the concrete below affording a convenient point of measurement. When this movement out of vertical abruptly increased a full inch to 3½-in. total, jacking was discontinued and additional guys were provided from the hip joints of the moving span to a corresponding location on the one adjoining. Pulling jacks were then used to draw the span back to its original position, and steel shims were inserted between layers of cribbing, to level the top surface. For precaution, the span was guyed with four lines of cable, two up and two downstream. Turnbuckles at shore ends were let out as upward movement progressed. A total of eight hours was required to jack the first span to final elevation.

Steel posts 12 in. square, each made up of four 3x3x$\frac{5}{16}$-in. angles laced and battened on four sides, were inserted to support the span while the old piers were concreted to the new level. The posts were left permanently in place. Temporary struts, connecting the posts to lower truss chords, were removed before the concrete had taken initial set. The same jacking members and cribs were employed for raising both spans.

New steel was furnished and erected and the old spans were jacked by the St. Joseph Structural Steel Co., St. Joseph, Mo. H. D. Barnes, then state engineer of construction and now state highway engineer, was in general charge of the Kansas highway department's field forces.



ARRANGEMENT of jacking beams, jacks and accessory bracing equipment used in raising 130-ft. truss spans to provide increased waterway. Jacks operated against existing piers.

Developments in the Operation of Sewage-Treatment Plants

Increased plant efficiency due to improvements in both design and operation—Advances in treatment devices and present practice enumerated

A REVIEW of experiences in the operation of sewage-treatment plants in Illinois, presented at the annual meeting of the Illinois Society of Engineers, called attention to some specific changes and improvements in practice. In discussing this subject, W. D. Hatfield, superintendent of the Sanitary District of Decatur, Ill., recalled that in early days sewage-disposal plants were often left to operate without attention, with the result that they became clogged and were then bypassed by action of local officials. In fact, 90 per cent or more of the early plants were not operating after the first year or so. However, sanitary engineers soon realized that sewage-treatment plants needed careful and regular year-round attention; sludge had to be drawn regularly, sprinkling filter nozzles required cleaning, filter stones had to be loosened to prevent pooling, and a multitude of other necessary duties were requisite if satisfactory operation and return on original investment were to be obtained. Unsatisfactory operation in the early days resulted from two major conditions: lack of funds to operate the plant, and the construction of plants without office and laboratory facilities.

Increased efficiency in plant operation has been due largely to the following factors: the sanitary district laws, which provide for a tax to cover operating costs; installation of sluice gates in place of stop-planks to make flexible operation easier; use of valves to equalize flow in tanks; water-supply facilities for hosing and cleaning; adequate office and laboratory buildings and machine shops; installation of meters, flow gages, pumps, gas collectors, etc.; use of more mechanical equipment; and the cooperative stimulation from the State Department of Health.

Although it is difficult to summarize the advance in operation as distinct from the advances in design and research, general progress in operation was briefly enumerated as follows:

Screens—Screenings are being handled with less nuisance; screens are housed from view, and screenings are either buried, incinerated or comminuted and returned to the sewage.

Grit Chambers—All plants, even those with separate sewer systems, should be provided with sand and grit-removal devices. Grit chambers should be provided with valves (not stop-planks), proportioning weirs and mechanical cleaning. The grit is inoffensive and may be used for fill on roadways or for resanding sludge-drying beds.

Primary Sedimentation—Since the demise of the septic tank, primary sedimentation takes place either in Imhoff tanks or in mechanically cleaned separate settling tanks. Improved operation of Imhoff tanks has been obtained by more liberally designed sludge-digestion chambers, in which sufficient digested ripe sludge can be maintained to neutralize acidity produced by freshly digesting sludge. Sludge should be drawn weekly in small quantities, and the sludge level should be maintained within 2 to 4 ft. of the slot. This requires large sludge-storage capacity or liberal sludge-drying-bed capacity. Reversal of flow in the tanks has not been found of value in most plants.

Flowing-through chambers should have grease-skimming devices. Scum in the gas vents may be kept broken up by paddles or fine water spray or may be allowed to accumulate and then pumped off to the drying beds with a diaphragm pump. Foaming in Imhoff tanks is not satisfactorily controlled by liming, but may be controlled by gentle water spray, preferably of supernatant liquor from the digestion compartment, although sewage or fresh water can be used. Plain sedimentation in mechanically cleaned tanks offers no unusual problems. In general, inlet and outlet velocities have been studied wih greater care, particularly with the square and round tank to improve their efficiencies.

Separate Sludge Digestion—Fresh primary sludge should be pumped often, in small amounts, before septic action sets in. Temperatures in heated tanks are most generally kept about 90 to 100 deg. F. Recirculation water should be kept above 120 deg. F. to protect the heater from corrosion, and below 140 deg. F. to prevent excess scale formation on the outside or sludge side of the heating coils. Agitation of sludge and greater velocity of water in coils are desirable. Multi-stage (usually two-stage) digestion is developing to conserve gas and space, and produces a better supernatant liquor. Many are finding that gas quality is a good index of the condition of digestion; that is, high CO_2 and a low methane and B.t.u. content are indications of a deteriorating digestive action.

Chemical coagulation to improve sedimentation has been studied at a few plants, but no plant in Illinois appears to be using this method. The plant now under construction at Danville, Ill., is designed for chemical treatment, and some of the Chicago Sanitary District plants anticipate the addition of chemicals to improve the operation of existing sedimentation tanks.

Gas Collection—Gas collection and utilization are becoming increasingly popular. The gas is utilized in heating buildings and sludge-digestion tanks, in operating incinerators for screenings, in burning the gas to produce power for activated-sludge plants and for pumping sewage and sludge. Gas is more valuable for power production than for heating, and power production will be the first consideration, followed by the economic reclamation of the waste heat from the gas engine for the various heating jobs about the plant.

Experience has shown that gas pipes exposed to freezing temperature must have a diameter of 2 in. or more to prevent freezing, and the collecting drums must be cool to allow condensation before gas enters the piping. Interesting experiences in the collection of large volumes of gas and the digestion of beer slop have been obtained at the Peoria Sanitary District and by the Illinois State Water Survey.

Sludge Drying—Sludge drying is done almost entirely on drying beds at present, although work of the Chicago Sanitary District indicates the economy of filtration and incineration. Most sludge-drying beds are too small; they should be designed to take care of sludge produced during regular operation in the winter. Proper drying requires good drainage, which in turn requires a well-prepared layer of sand or grit on the gravel. About 3 in. is required for best results. Sludge may be removed in winter (particularly when frozen) as well as in summer.

Sprinkling Filters—Good filter operation requires that proper design be provided for easily flooding filters to kill psychoda larva, chlorine treatment if pooling is aggravated, regular daily cleaning of nozzles, and a short dosing cycle. Best results appear to be obtained where at least three or four doses are given the beds each hour. Flooding the beds occasionally also aids in sloughing off the excess film on the stones. Some very interesting experiments on high rate of dosing (20 or more m.g.d.), with forced aeration of the stone bed, are being made by the Chicago Sanitary District and also at Iowa State College.

Secondary Sedimentation—Secondary sedimentation presents a similar problem to that in primary sedimentation practice—namely, control of inlet and outlet velocities and regular pumping of sludge. The problem of velocities is intensified by irregular flow from periodic dosing.

Activated Sludge—Progress in the operation of activated-sludge plants has been gradual, but it is being advanced on a rational basis. The major factors are strength of sewage, length of aeration period, amount of sludge returned, and the quantity of air used. The strength of sewage is a governing factor and, therefore, a rapid method of determining the strength is needed. The sludge index or rate of settling to weight of sludge

has been most valuable in studying bulking. Although 3,000 to 4,000 p.p.m. of suspended activated sludge has been recommended in the aeration tanks, experience in many plants has shown that about 2,000 to 2,500 p.p.m. is more practical; with mechanical aeration, 500 to 600 p.p.m. of sludge is carried in the aeration liquor.

For diffused-air aeration, spiral flow seems to be preferred, and wider tanks are more economical in air and construction cost. From 0.3 to 1.0 cu.ft. of air per gallon of sewage is generally used, depending on the strength of sewage. Great economy in air has resulted by keeping the dissolved oxygen in the aeration liquor at the outlet of the tanks between 2 and 4 p.p.m.

Reaeration of sludge seems advisable with strong sewage or industrial wastes. Short periods of reaeration are of no value, but periods varying from 15 to 75 hours have been found of value under certain trade-waste conditions.

An activated-sludge plant should have sufficient capacity for wide variation in sludge return. Since return sludge is 98 per cent purified effluent and 2 per cent sludge solids, it acts as a diluent for strong sewage and is an effective means of handling "shots" of strong industrial waste.

Excess activated sludge is generally wasted to the primary settling tanks and digested with the sewage solids. It furnishes considerable gas, which is now important as an aid in reducing power costs. It behooves all activated-sludge plant operators to recover all the solids, grease and skimming and convert them into gas and thence into power. By this means activated sludge may compete with or even improve upon the costs of the less efficient processes of chemical sewage treatment.

Plant Records—A real advance has been made in the keeping of complete "long-time" records of flows, analyses, removals and all details of plant operation. Seven-day charts on the meters are much more useful than the usual 24-hour charts. The former give a better perspective of the daily-weekly flow, cost one-seventh as much and require one-seventh the filing space.

Views on the Highway Situation Expressed at Atlantic City

Speakers at annual meeting of North Atlantic States Highway Officials are concerned over gas-tax diversion, falling off in state expenditures, accidents and highway esthetics

ENLIGHTENING VIEWS on the highways of the present and the future were expressed by several speakers at the twelfth annual convention of the Association of Highway Officials of the North Atlantic States, held at Atlantic City, Feb. 12-14. Topics discussed include invasion of the highway field by WPA, falling off of state expenditures for highways, accidents and highway esthetics. Diversion of gas taxes was condemned by several speakers and by the convention as a whole by resolution. The meeting was reported briefly in our news pages of last week.

Chevalier hits relief work

Willard Chevalier, vice-president of the McGraw-Hill Publishing Co., in charge of *Engineering News-Record*, president, American Road Builders Assn., raised the pertinent question "How long are we going to put up with the present relief idea of building roads before we get back to the sound basis of providing the necessary safe roads at the lowest cost?" He traced the development of highways from the early days of getting the country out of the mud, down through the introduction of federal aid, which he classes as the greatest impetus ever given highways, through the great technical improvements of the 1920's, leading up to the federal emergency aid of the depression and the present relief-works program involving roadbuilding. Today, he declared, roadbuilding has been changed to job-making, and the great function of highway construction has turned into a relief agency.

In looking ahead, Colonel Chevalier said the first thing to do was to get out of relief and into constructive roadbuilding, which requires that highway building be given back to highway engineers and departments. To do this, we must stop running to Washington for help, for already we have shouldered all too many of our highway problems on the federal government. The states must resume their sovereignty as highway builders, but necessarily on a tapering-off basis. The gas tax is not an excise tax, the speaker said, but is distinctly a user tax, a charge for service rendered. This fact renders the diversion of funds collected from gas taxes to other than roadbuilding purposes inequitable. He believes diversion will some day be prevented by constitutional amendment in many states.

Ahead of us is a job of modernization and the protection of the huge investment in highways. Rational planning is needed, and it is time to stop relying upon the pressure of small blocs in formulating our highway policies. It is time to unify motor-transportation interests, Colonel Chevalier declared. More than 10 per cent of our national economy is made up of highways, counting the road planning and construction, the manufacture and transportation of materials going into roads, the making of motor cars and its vast ramifications, the supplying and transportation of fuels for motor cars, and the business of feeding and caring for the users of the highways. No other investment, he said, has returned the cash value equal to that of highways, not considering the social benefits.

In discussing the future of federal aid, Colonel Chevalier said he couldn't foresee its abolishment. The actual cash provided by federal aid is only incidental; the real value lies in the coordinating influence, the encouragement, the impetus and the standardization and technical improvement offered through the U. S. Bureau of Public Roads.

The needed improvements to existing roads to make them safe, the new construction required to provide adequate traffic ways, and all other highway problems pertaining to safety, obsolescence and improvements can be solved if the public demands that highway taxes go for highway purposes and if federal aid is continued, declared Colonel Chevalier.

MacDonald fears reduction

Highway construction faces a serious curtailment, declared Thos. H. MacDonald, Chief, U. S. Bureau of Public Roads, unless the states make immediate plans to take up the slack occasioned by the ending of emergency federal-aid funds. A reduction of 30 per cent in roadbuilding is certain next year, he declared, unless the states provide more funds of their own, and this reduction will grow to 50 per cent unless the trend toward diversion of gas taxes is checked. He based his predictions on figures quoted at the Cleveland A.R.B.A. meeting (*ENR*, Jan. 30, 1936, p. 163), which showed that as federal contributions have increased during the past few years state contributions have correspondingly decreased.

Mr. MacDonald pointed out that the states could not afford to reduce expenditures for highways because of the constantly-mounting costs in highway system operation. Some of the elements increasing in cost are:

Maintenance Costs—There has been a sharp rise in the expenditures for maintenance equipment, interest and miscellaneous items. The total state expenditures in 1934 for these purposes were nearly $300,000,000. This sharp rise reflects the increased maintenance liability growing out of the increased use of low-cost roads. This trend is impor-

tant since the growth in mileage of low-cost surfaces is bound to increase as the highway departments are responding to the public pressure to extend safer and more adequate types of surfaces.

Extension of State Control—From 1932 to 1935 there was an increase in the surfaced mileage of secondary roads under state control of 51,000 miles. A number of states have placed all or a large part of the local roads under state control, and there is a growing sentiment in this direction. It is important to observe, however, that in no case has the transfer of these largely increased responsibilities been accompanied by a transfer of the funds in whole which were formerly used by the local officials upon these secondary or local roads. The addition of this increased load would have stopped all important new construction in several states had it not been for the increased federal appropriations; when these appropriations are no longer available, these states face the problem of not being able to finance any new construction.

Increase in Secondary Surface Mileage—One of the striking developments of this present period is the accelerated increase in surfaced mileage, mostly of the low-cost type on secondary or local roads under control of the local governmental units. In the five-year period 1930-34 this increase amounted to 218,000 miles, of which 212,000 miles were of the low-cost type. This increase is double that of the previous five years, but it does not reflect a larger support by local units. Rather, support has come from the greatly increased federal funds supplied by PWA, FERA and other federal unemployment relief agencies.

Railway Grade-Crossings—The states must take notice of the changed situation in the financing of railway-highway crossing improvements. In the past the cost of these improvements has been apportioned according to state laws, drafted when the relative traffic on the highways and railroads was very different than it has since become. The U. S. Supreme Court, as well as the lower courts have taken cognizance of this changed situation. As a result, the highway interests are paying a larger proportion of the total cost than formerly, and this proportion is constantly increasing. So far the federal funds have supplied the greater part of the highway's share.

Modernizing Existing Highways—In the same class as the necessary grade-crossing improvements is the necessity for the revision of many of the earlier constructed highways to promote highway safety and economy in highway transportation. Basically, in dealing with highway safety, progress must come through various methods—public education in the proper use of facilities, adequate regulations and law enforcement, and (very important) the greater recognition of the involuntary reactions involved in human behavior on highways.

Facing the Needs: The trend is markedly to divert the special road-user taxes from the state highway departments and at the same time add mileages beyond their ability properly to improve and maintain. Obsolescence and depreciation do not indulge in holidays, which answers the charge that we have enough roads and should take a roadbuilding holiday. Because of the public pressure for rapid increase in the mileage of surfaced roads, the highway officials have been forced to spread the funds so thin that a very large part of the capital invested is now in jeopardy. Following is a conservative statement of the reconstruction needs of the highways only under the jurisdiction of the state highway departments:

RECONSTRUCTION NEEDS—STATE HIGHWAY SYSTEMS

		Miles Per Yr.
State highways:		
Total surfaced mileage	271,614	
Total unsurfaced mileage	52,698	
Annual construction program required:		
To surface unsurfaced mileage in 10 years		5,269
To reconstruct low-type mileage in 15 years		10,800
To reconstruct high-type mileage in 40 years		2,740
Secondary roads under state control:		
Surfaced mileage	74,450	
Unsurfaced mileage	95,794	
Annual construction program required:		
To surface unsurfaced mileage in 20 years		4,800
To reconstruct low-type mileage in 30 years		2,400
To reconstruct high-type mileage in 40 years		50
Total annual construction program required		26,059

To this picture of the immediate and future requirements of the state highway departments for funds for annual work must yet be added a like analysis of the needed development of local roads. Where these two are brought together, the magnitude of the unsoundness of diversion of road-user funds from the highways should be apparent to anyone who can be convinced by facts.

Highway esthetics

M. W. Torkelson, director of regional planning, Wisconsin State Planning Board, discussed highway esthetics and roadside beauty from a practical standpoint. He stated that the test of a highway, like everything else, is that of fitness. To attain fitness, the highway must possess the three essential qualities of utility, safety and beauty, named in that order because that is the order of their appreciation by both engineers and the traveling public. He rates an adequate right-of-way in the right location as the essence of proper roadbuilding considered from every standpoint. Pavements are temporary, he stated, for we are now abandoning and tearing out pavements with many years of life because they are obsolete.

In discussing roadside landscaping, Mr. Torkelson listed three fundamental propositions: First, that roadside improvement should include more than the mere right-of-way; it should take in the entire landscape visible from the road. Second, almost without exception the natural landscape is beautiful. If the roadside landscape is ugly, it is because man has done something to make it so. Third, the problem of highway beautification is nothing less than the preservation of the landscape, either in its natural state or in a state of proper and beneficial use, consistent with social purposes, and its restoration to such state or use in cases where some act of man has created an eyesore.

He pointed out the necessity of planning for future conditions, citing several instances where trees and other roadside landscaping have been destroyed in his own state because of necesary widening operations. He also deplored the tendency of some highway engineers to stick to a designed cross-section of roadway, regardless of application in the field. The building of deep drainage ditches on both sides of the road, though often needed only on one side, was pointed out as an example.

Highway engineers were severely criticised for "wooden and dumb" designing by Gilmore D. Clarke, consulting landscape architect, Westchester County Park Commission. He condemned the attitude of highway engineers that the shortest distance is best, preferring following the contours where possible rather than long tangents with resulting high fills and deep cuts. The Merritt Parkway in Connecticut, of which three miles have been built, was held up as a horrible example of highway design and planning. Mr. Clarke in particular objected to two long tangents on this highway being connected by a curve of 455-ft. radius. He also objected to the design of concrete bridges on this highway as being ugly. Other concrete bridges, all of the beam and trestle or girder type, were criticised. He showed pictures of arch and curved lower chord bridges as exemplifying the beautiful in bridges. All of these were faced with stone, but the speaker conceded the same beauty was obtainable by the use of concrete alone.

Mr. Gilmore also deplored the "ribbon" development of modern highways, where a new road is slashed through the countryside and very soon is lined with cheap shacks and ugly gas stations. The Grand Island Parkway between Niagara Falls and Buffalo was the horrible example in this case. He pointed out that this parkway offered unusual opportunity of building a "freeway," defined as a highway development "in which the abutting property owners have no right of light, air or access, except at points where such access shall be specifically provided."

Safety considerations

John W. Wheeler, member of the Indiana Highway Commission, pleaded for cooperation between the manufacturer of the motor car and the highway engineer in the interest of highway safety. He

regards as unreasonable the situation where the highway designer has no knowledge of the coming development in motor cars, and likewise where the motor-car designer has no knowledge of the limitations of the highway. The attention being given highway accidents and the threatening restrictions on motor-car speeds should serve as a warning that such cooperation is needed. Mr. Wheeler points out that 25 m.p.h. is a recognized safe speed, that 300 m.p.h. is a possible speed; somewhere between these two is a sensible speed. By arriving at a maximum speed at which the average human being can best control his car and then designing the vehicle and the road for that speed, the transportation engineer will do more toward the prevention of traffic accidents than has been done in the past quarter of a century, Mr. Wheeler declared.

Paul G. Hoffman, president, Studebaker Corp., outlined the attitude of the automobile manufacturers toward safety. He deplored the horror campaign to force safe driving, holding that hysteria never produced a sound solution to any problem. The motor manufacturer is building the safest car that they know how to build. Keeping the motor car and truck in the safe condition in which it was built, training and educating the driver, and disciplining those who still drive unsafely is the best program for promoting highway safety.

Letters to the Editor

Soils-Laboratory Device for Determining Consolidation

Sir—I have been intensely interested in the articles concerning soil-testing apparatus which have appeared in *Engineering News-Record* this year, and the description of Professor Casagrande's universal soil-loading machine in the issue of Dec. 5, 1935, prompts me to write the following description of apparatus which has been built at the Thayer School of Civil Engineering, Dartmouth College, during the past two years.

The machine that has been installed in the soil-mechanics laboratory at Harvard University seems far superior in scope and operation to any previously developed. The apparatus described here is largely based on the Harvard design and includes features of machines used by the writer at the Massachusetts Institute of Technology and in the laboratories of Moran and Proctor, consulting engineers in New York City. Only one of the four tests accommodated by the universal machine gives results capable of practical evaluation in the investigation of the settlement of structures. This is the consolidation test. For field laboratories and for permanent laboratories primarily interested in settlement analysis a simplified machine, as described below, may prove practicable.

The details of the loading apparatus are shown in Fig. 1. This machine was designed for making four consolidation tests simultaneously. At very slight increase in cost it could be adapted to direct permeability tests. The loading and counterweight levers are suspended on knife-edges, and all forces are applied along the center lines of the beams. The cross-arm through which load is applied to the consolidation device is connected to the levers through pin joints designed to maintain a vertical load at all times and to eliminate any possible eccentricity of load that might otherwise develop.

The deflection dial, with an accuracy of 1/10,000 in. and mounted rigidly on the frame, bears against the cross-arm directly above the point of application of load, which is transmitted through a chilled steel ball to the piston of the consolidation device. Accurately calibrated cast-iron weights are used, which give load increment intensities of ¼, 1, 2 and 4 tons per sq. ft. on the soil sample. The frame of the loading machine is constructed of seasoned lumber for the sake of economy in this particular installation; a structural-steel frame might be almost as economically built under other conditions.

The consolidation device is shown in Fig. 1. Its principal feature is the "floating" testing ring originally adopted by the Moran and Proctor laboratory. This makes it possible to test ordinary 3-in. samples with no reduction of applied pressure through side-wall fric-

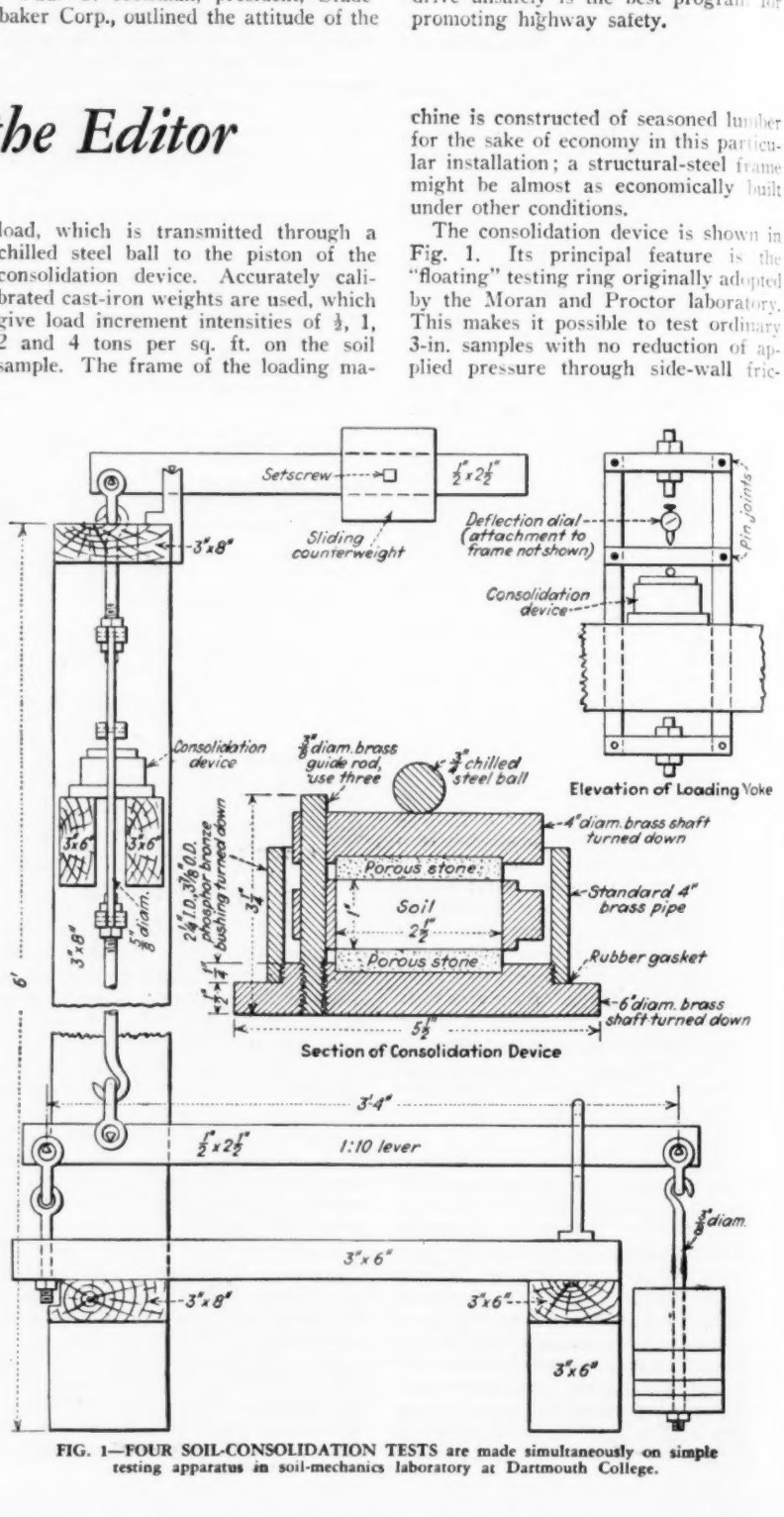


FIG. 1—FOUR SOIL-CONSOLIDATION TESTS are made simultaneously on simple testing apparatus in soil-mechanics laboratory at Dartmouth College.

tion, which develops in confining rings that bear on a rigid base.

The accuracy obtainable with the apparatus is well within that demanded of settlement analysis tests. Costs of labor and materials are about as follows: loading-machine frame for four units, $45; lever assembly for one unit, $35; cast-iron weights for loading range from ½ to 12 tons per square foot, $10; deflection dial, $26; consolidation device, $30. This brings the total cost of the apparatus for the consolidation test to less than $115 per unit. There are few structures requiring settlement analysis in which such an expenditure for field-laboratory apparatus would not be readily absorbed.

WILLIAM P. KIMBALL,
Assistant Professor of Civil Engineering, Dartmouth College.
Hanover, N. H.,
Dec. 20, 1935.

Earthquake Design

Sir—The Dec. 19, 1935, issue of *ENR*, p. 856-860, contained an article by C. H. Kromer entitled "Earthquake-Resistant Construction Applied to California Schools." This included useful and interesting practical data, but also several statements to which the writer takes exception.

First, Mr. Kromer states, "Since buildings designed on a static basis have survived very severe earthquakes with little or no damage, it is apparent that this system of design is satisfactory for most buildings." This point of view is irrational in that it apparently ignores the fact that the statical method cannot represent the effects of two important phenomena: end conditions and synchronism, which may profoundly affect both the amounts and locations of the maximum shears and moments.

Second, it is stated, "Resonance, fortunately, generally can be considered as only momentary and its effects discounted. When prolonged, it is most destructive." That resonance or synchronism is important has been demonstrated not only theoretically but also by experiment. Recent field work by the U. S. Coast and Geodetic Survey on the forced vibration of buildings shows distinctly that synchronism is felt almost immediately and over a relatively wide range on both sides of "exact synchronism," depending on the degree of damping in the system.

Third, Mr. Kromer states, "This is accomplished by . . . keeping in mind that forces are resisted by all elements in proportion to their stiffnesses." Where the end conditions or fixities of the various elements differ appreciably from each other, this statement does not hold, for in that case the seismic forces will be distributed to the structural elements also as a function of the end conditions of the elements. (*ENR*, Nov. 1, 1934, p. 553).

These points are raised by the writer to stress the fact that any seismic analysis which pretends to be rational must acknowledge that the problem is primarily one of dynamics. It is all very well to say that since buildings designed on a statical basis have survived severe earthquakes with little damage, this system of design is satisfactory for most buildings. It should be kept in mind, however, that these buildings may have such an excellent record partly for the reason that the earthquakes were non-synchronous. Whether these buildings would survive undamaged a major earthquake of synchronous period is another question, the answer to which depends on whether the statical design will be equal to the dynamical tests.

In closing, it is perhaps appropriate to quote from a recent article in *ENR*, Nov. 28, 1935, p. 742, by our own engineer-extraordinary John F. Stevens: "What then should the engineer be? A mere plodder, a copier, one who only follows along the tracks made by his predecessors, perhaps only trying to better their methods somewhat, but in the end producing the same results?" . . . "No, the true engineer will be one who, while 'holding fast to that which is good,' will strike out along new lines and will conceive new ideas which will be translated into the kind of wealth which will bring greater happiness and comfort to mankind."

Philadelphia, Pa.
Dec. 24, 1935.
JACOB J. CRESKOFF,
Consulting Engineer

Suicides From Bridges

Sir—There is an unfortunate tendency of despondent persons to use high bridges as convenient places from which to commit suicide. One structure in particular has the shocking record of 68 deaths, while another has scored 36. The matter seems to be attracting considerable public attention, not merely from the sensational press on account of its spectacular and tragic aspects but from humanitarian, public-spirited citizens and societies, and a considerable demand for remedial measures is manifested. Doubtless there are many other structures which, particularly at this time, are having unenviable records for suicides built up. Statistics on this subject, if gathered together, would doubtless provide cause for careful thought on the part of bridge designers concerning the desirability of designing hand-rails so as to make it practically impossible to jump from the sidewalk or roadway of a bridge. The problem admittedly is one of economics as well as esthetics and proper regard for community spirit.

Large structures at considerable height above the surrounding terrain and located at or near large centers of population are those where the temptation to commit suicide is undoubtedly the strongest.

Probably one of the most notable examples of such a problem and a satisfactory solution is the bridge constructed across an arm of Sydney Harbor and opened to traffic in 1932. During the following two years 43 persons took their lives by leaping from the deck of this structure. The officials of Sydney thereupon arranged for the installation of a wire-mesh fence 8 ft. 10 in. high and having an inward curving surface at the top. There have been no further suicides since the installation of this protective arrangement.

The problem is brought up in this communication in the hope, first, that information may be elicited from persons responsible for the design and maintenance of structures to be built and operated under conditions such as are briefly described; second, that, at least in some cases, if the problem seems to warrant such a solution, drastic modifications of our preconceived ideas concerning what constitutes adequate hand-rails may be developed; and third, that suggestions may be made for the design of suicide-proof additions or extensions to railings of existing bridges where suicides have already occurred.

MERRILL BUTLER,
Deputy Engineer, Design Bureau of Engineering.
Los Angeles, Calif.,
Dec. 6, 1936.

Structural Analysis as Geometry

Sir—Professor Cross' articles on structural analysis (*ENR*, Oct. 17 and 24, 1935) emphasize again the lack of appropriate fundamental methods. What we want is the analysis of structures and not the analysis of stresses. Analysis of structures is a purely geometrical problem—i.e., determining the geometrical deformations produced in a structure by the yielding of one part of it. A structure subjected to unit linear or angular displacement or separation at any one section—reproducing the several possible ways of failure which we want to avoid—forms geometrical curves, easily analyzed and expressed in geometrical terms or equations; these curves are the influence lines of the hypothetical stresses wanted.

The proper way to analyze the continuous truss mentioned by Professor Cross (p. 536, Column 2) is to suppose it lifted or lowered by any unit distance at one support and write down the simple equation of the geometrical curve thus formed. Having thus analyzed the structure, the stress analysis reduces itself to multiplying the vertical loads by the vertical ordinates of the curves. In this way the designer's attention is kept on the structure, as it should be, instead of being turned to artificial stress diagrams, which indeed have nothing to do with good engineering. Numerically exact results are also obtained with a very small fraction of the mental effort and time taken by present approximate stress analysis.

OTTO GOTTSCHALK.
Buenos Aires,
Dec. 23, 1935.

Book Reviews and Notes

A Monthly Commentary on Current Additions to the Civil Engineer's Library

Testing Machines

MATERIALS TESTING MACHINES—Bulletin 75, Baldwin-Southwark Corp. By C. H. Gibbons. Cloth; 5x8 in.; pp. 89; diagrams, photographs. Distributed by Baldwin-Southwark Corp., Philadelphia, Pa.

SINCE THE HISTORY OF TESTING MACHINES is largely the history of our knowledge of engineering materials, this account, written by one of the engineers of a well-established manufacturer of testing equipment, is of real significance and interest to engineers generally. An appreciation of the genius of the early metallurgists and physicists as well as of the present-day scientists and craftsmen is obtained from a reading of this booklet, which also provides information on the many varieties of modern testing machines.

Steel Construction in Germany

STAHLBAU-KALENDER 1936—Issued by the Deutschen Stahlbau-Verband. Cloth; 4½x6¾ in.; pp. 493. Combination handbook and year book with diagrams and tables. Published by Wilhelm Ernst & Sohn, Berlin. Price 4.50 RM.

THE SECOND EDITION of the "Stahlbaukalender," an annual notebook on steel construction, of which the first edition appeared in 1935, has been revised and enlarged in a careful manner. The first four chapters contain data and formulae about general statics, elasticity and strength of materials, and special statics for buildings. The next three chapters deal with German building codes and standard specifications for all kinds of steel structures, buildings, and railroad and highway bridges. The last chapter contains an abstract of the building codes and the standard specifications of other European countries, also of the United States.

The subject of railroad and highway bridges appears for the first time in this book and includes a very interesting part for the American engineer on welded construction. The German rules for welded buildings and bridges were revised completely in 1935, the allowable stresses having been raised, but the designing must be much more carefully done. It might be mentioned, for example, that the allowable stresses for railroad bridges with weldings subject to alternating stresses and with through girders are different for bridges with a traffic of less than 25 trains per day than for bridges with heavier traffic.

For the American engineer who desires to familiarize himself with European steel construction and design this little book may be highly recommended. It is printed in German. R. B.

Irrigation

WATER RIGHTS FOR IRRIGATION—By S. T. Harding. Paper; 5½x8½ in.; pp. 176; a photolithic reproduction. Published by Stanford University Press, Stanford University, Calif. $2.25.

LEGAL, ENGINEERING AND PUBLIC POLICY ASPECTS of water rights, as affecting irrigation, constitute the subject matter of a new book by S. T. Harding, professor of irrigation engineering at University of California. Professor Harding has been teaching this subject to engineering students for more than twenty years. His classes used as text Chandler's "Elements of Western Water Law" until it was out of print. In recent years mimeographed notes prepared by Prof. Harding have been used to outline the history and classification of water rights, the general principles of riparian and appropriation rights, underground waters and other essentials of the broad subject of water ownership and legislation. Use of these notes in the classroom has afforded opportunity to revise and develop them to attain a high degree of effective presentation of the material. It is these notes that constitute the major part of the new book.

Structures

ANALYSIS OF FRAMED STRUCTURES—By John H. Matthews and Phillip E. Soneson. Cloth; 6x9 in.; pp. 313. Published by McGraw-Hill Book Co., Inc., New York City. $3.50.

DESIGN OF CONCRETE STRUCTURES—By Urquhart and O'Rourke. Third Edition. Cloth; 6x9 in.; pp. 556; tables, diagrams. Published by McGraw-Hill Book Co., New York, N. Y. $4.50.

ELEMENTARY STRUCTURAL PROBLEMS IN STEEL AND TIMBER—By C. R. Young. Second Edition. Cloth; 6x9 in.; pp. 315; tables and diagrams. Published by John Wiley & Sons, New York, and Chapman & Hall, London. Price $4.

A NEW BOOK on analysis of framed structures and two new editions of well-known books on structural design are available for the engineer's library. The new book by Matthews and Soneson, is dedicated to the idea of simplicity in presentation and language, with emphasis on concepts of structural action rather than on the mechanics of analysis. From basic considerations of equilibrium the reader is introduced to roof trusses, mill buildings and bridges. Chapters on influence lines and on beam and truss deflection are included.

The revision of the Urquhart and O'Rourke book, last revised in 19[illegible], sets forth the latest and best practice in plain and reinforced-concrete design. In the development of the elementary design theory the principle of the transformed section has been used in addition to the usual design formulas. Additional material has been added to the chapter on footings, including designs of typical multiple column footings and a method of proportioning footings for uniform settlement. A large variety of floor constructions, particularly for lighter loadings, is included. In the chapter on highway bridges, complete designs of the various types are presented. Tables and diagrams have been expanded for use with the higher-strength concretes.

Profesor Young's book on structural problems is entirely one of design and covers about 200 items relating to tension members, compression members, beams, box girders, plate girders, steel trusses and bents, crane and crane supports and timber structures. Some of the new problems included pertain to welded connections, wall-girder torsion, reinforcement of a beam web for shear, wind stresses in a bent due to a combination of pressure and tension, and moments, shears and floorbeam concentrations due to moving loads on beams, girders and trusses.

X-Ray Examination Of Metal Structures

Reviewed by J. C. Hodge and R. E. Hiller

The Babcock & Wilcox Co., Barberton, Ohio, and Boulder City, Nev., respectively.

ENGINEERING RADIOGRAPHY—By V. E. Pullin, C.B.E. Cloth; 8x11 in.; pp. 136. Photographs, drawings, curves. Published by G. Bell and Sons, Ltd., London, England. The Engineers Book Shop, 168 E. 46th St., New York. $16.

THE ENGINEER quite unfamiliar with the current applications of x-ray examination to metal structures, this book provides a brief but authoritative description of procedures and possible applications of the method. It includes a brief general description of x-ray methods, apparatus and technique, but is essentially a series of studies in which specimens have been examined by x-ray and then sectioned to correlate the actual defective areas with the images appearing on the radiograph. The book is liberally illustrated from these studies and has accomplished its purpose as an aid to the interpretation of defects as revealed by radiographs. A considerable number of illustrations accomplish this in an excellent manner for a variety of steel castings, showing cracks, shrinkage cavities, gas pockets,

sand inclusions and other casting defects.

Unfortunately the studies on welded joints are more limited in number. Furthermore, the weld illustrations are from very poor quality welds and are not from welds representative of present-day welding practice. The book is therefore of greatest value to the foundryman or to the engineer dealing with castings. It will be of little value to the construction engineer in the examination of welds in a welded structure.

The last chapter of the book is devoted to applications of radiography with gamma rays, giving methods of procedure in using radium and containing some excellent illustrations of results obtained. It points out the particular advantages of gamma rays for examining parts of heavy castings or structures not accessible to x-ray equipment.

Miscellaneous Notes on Booklets and Reprints

DIESEL ENGINE POTENTIALITIES and possibilities in transportation are discussed in Research Series No. 49, Engineering Experiment Station, Purdue University, Lafayette, Ind. Price, 25c.

THE SCOPE FOR UNIFORMITY IN STATE TAX SYSTEMS is the subject of Special Report No. 8 of the State Tax Commission, Albany, N. Y., prepared by Richard A. Girard. Special Report No. 9 covers state grants-in-aid as a means of state participation in local affairs.

PLASTER MODEL STUDIES as a means of predicting the strength of structures are described in Bulletin No. 81 of the Engineering Experiment Station Series, University of Wisconsin, Madison, Wis., written by Raymond J. Roark and Richard S. Hartenberg, of the department of mechanics. Price, 25c.

"A HOUSING PROGRAM FOR THE UNITED STATES" is the title of a complete report of the four-day conference at Baltimore which followed the conclusion of the tour of fourteen American cities by a group of American and foreign housing experts last fall. It has been issued by the Public Administration Service, Chicago, as Bulletin No. 48. (Price, 50c.) The report principally is the work of Sir Raymond Unwin.

FIREPROOF LUMBER of red oak and maple for flooring and interior finish, manufactured by the Protexol Corp., Kenilworth, N. J., is the subject of a recent report of the Underwriters Laboratories, Chicago. The report covers extensive tests of this chemically treated lumber and concludes that it will not ignite readily, that it will char progressively when exposed to fire, but will cease glowing shortly after the exposure. Also, that the salts are chemically stable at ordinary indoor temperatures and not likely to decompose with age. The report, of 104 pages, gives details and results of all tests made.

DESIGNING FOR CONTINUITY in concrete building frames is outlined in a recent booklet of the Portland Cement Association, 33 West Grand Ave., Chicago.

THE GASOLINE TAX IN THE UNITED STATES, 1934, is the subject of a pamphlet issued as Publication No. 4, Public Administration Service, 850 East 58th St., Chicago, Ill. (50c.).

"HIGHWAY - CONSTRUCTION EXPENDITURES" is the subject of an economic and statistical analysis prepared by C. F. Rogers, R. E. Hertel and R. W. Kruser, of the U. S. Bureau of Public Roads. Copies may be obtained from the Superintendent of Documents, Washington, D. C. Price, 15c.

EFFECT OF TIME YIELD IN CONCRETE upon deformation stresses in a reinforced-concrete arch bridge, another joint research by the Bureau of Public Roads and the Engineering Experiment Station of the University of Illinois, is the subject of Bulletin 275 of the Station. Price, 40c.

THE STRENGTH OF WOODS grown in the United States is the subject of Technical Bulletin 479 of the Forest Products Laboratory, Madison, Wis. The new bulletin is a revised and amplified edition of Bulletin 556, the best-known compendium of knowledge on the mechanics and related properties of timber. The authors are L. J. Markwardt and T. R. C. Wilson. Price 25c., from the Superintendent of Documents, Washington, D. C.

A TECHNICAL REPORT ON CONSTRUCTION OF MORRIS DAM, by Verne L. Peugh, construction engineer, water department, Pasadena, Calif., recently has been published by the city of Pasadena in mimeographed form with charts, drawings and full-page halftones on special paper stock. (Limited edition available at $2.50.) The introductory statement by Samuel B. Morris, former chief engineer and general manager of the Pasadena water department, announces that the purpose of the report is to bring together data of value in the operation and maintenance of the structure and in the construction of other dams.

INDUSTRIAL STATISTICS of the depression years are presented in a series of charts prepared by the American Fore Group of Insurance Companies, 80 Maiden Lane, New York. The charts are based upon index figures prepared by *Engineering News-Record*, *New York Times Annalist*, the U. S. Bureau of Labor Statistics, the Newsprint Service Bureau and the Rubber Manufacturers Association, adjusted so that the lowest month of the depression equals 100. The charts thus indicate the direct percentage recovery from the low point month as well as the percentage of the drop to that month from a previous high month. Among the statistics covered are construction costs, volume and wage rates, wholesale prices and prices of farm products, of food, leather, textiles, metals, and building materials, freight-car loadings, and production of electric power, lumber, zinc, newsprint and crude rubber.

New Books and Revised Editions

[Those desiring copies of the books listed below or mentioned elsewhere in this section should order them from the publishers or from their local booksellers.]

ARCHITECTURAL DRAWING AND DETAILING—By J. Ralph Dalzell and James McKinney. Cloth; 5½x8½ in.; pp. 212; line drawings. Published by American Technical Society, Prexel Ave. at 58th St., Chicago.

DOUGLAS FIR USE BOOK—Structural Data and Design Tables. Paper; 8x11 in.; pp. 209; tables, diagrams. Published by West Coast Lumbermen's Association, 364 Stuart Bldg., Seattle, Wash. Price $1.

ELEMENTS OF DIESEL ENGINEERING—By Orville Adams. Cloth; 6x9 in.; pp. 478; halftones, diagrams, tables. Published by the Norman W. Henley Publishing Co., New York, N. Y. Price $4.

FLOODS IN THE UNITED STATES: Magnitude and Frequency—Geological Survey Water Supply Paper No. 771. By C. S. Jarvis and others. Paper; 6x9 in.; pp. 497; numerous tables, diagrams and maps. Published by the Superintendent of Documents, Washington, D. C. Price 25c.

HANDBOOK OF APPLIED MATHEMATICS—Second edition. By Martin E. Jansson; revised and enlarged by Herbert Druery Harper, with a section on Business Mathematics by Peter L. Agnew. Fabrikoid; 5x8 in.; pp. 1,010. Published by D. Van Nostrand Co., Inc., New York. Price $6.

AN INTRODUCTION TO PROJECTIVE GEOMETRY—By L. G. N. Filon. Fourth edition. Cloth; 5x9 in.; pp. 407; line drawings. Edward Arnold & Co., London. Longmans, Green & Co., New York. Price $5.50. (16s. in Great Britain.)

OLD COVERED BRIDGES—By Adelbert M. Jakeman. Cloth; 6½x10 in.; pp. 107; photographs. Published by Stephen Daye Press, Brattleboro, Vt. Price $2.50.

PROCEEDINGS OF THE PUNJAB ENGINEERING CONGRESS, 1935 — Vol. XXIII. Cloth; 5x9 in.; pp. 197; photographs, diagrams, tables. Published by The Punjab Engineering Congress, Lahore, India.

RAINFALL AND RUN-OFF IN THE UNITED STATES: Studies of the Relationship—Geological Survey Water Supply Paper No. 772. By W. G. Hoyt and others. Paper; 6x9 in.; pp. 301; numerous tables and diagrams. Published by the Superintendent of Documents, Washington, D. C. Price 25c.

RAINFALL INTENSITY - FREQUENCY DATA—By David L. Yarnell. Miscellaneous Publication No. 204, U. S. Dept. of Agriculture. Paper; 6x9 in.; pp. 68; numerous diagrams and tables. Published by the Superintendent of Documents, Washington, D. C. Price 10c.

STRESSES IN STATICALLY INDETERMINATE STRUCTURES—By H. Yu. Second edition; paper; 7x10 in.; pp. 494; tables and diagrams. Published by the National Wuhan University Press, Wuchang, China.

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February 27, 1936

For a Real Investigation

AS A RESULT of the Hawk's Nest tunnel silicosis inquiry, the House Labor Committee is asking for power to conduct a full investigation of silicosis as an industrial disease. The idea is excellent, but the procedure contemplated is wrong inasmuch as the subcommittee that made the inquiry would conduct the new investigation. As stated in these columns two weeks ago, the job is too big for this subcommittee, it is too big for the Department of Labor; it is a job only for a competent board, operating under Congressional authority and financing, made up of representatives of the Bureau of Mines, the Public Health Service, construction interests, mining and manufacture. Silicosis is more than a labor problem—it is one of health and pathology, industrial operation, practical prevention, petrography and legislation, as well as labor. A real investigation by adequately equipped men is needed for dealing with this serious industrial problem. Anything less will be time and effort wasted.

Don't Forget the Welders!

AS STRUCTURAL WELDING becomes more commonplace and successfully welded structures become more numerous, there may develop a belief that good welders are as readily available as good carpenters or riveters. This is certainly not true now and probably never will be, suggesting that prequalification tests for welders should be accepted as a permanent part of all welding routine. A pertinent illustration of the scarcity of good welders was furnished on one of the large new buildings in Washington, where it was desired to weld certain plates at the column splices. Several successive sets of qualification specimens had to be tested before satisfactory results were obtained. And then only one welder of the group was able to qualify! Without prequalification, welding unquestionably was not justified. With it, and with thorough visual inspection, welding has demonstrated its adequacy time and again. In reading such articles as the one in this issue on welding under dynamic loads, and in attempting to utilize its well-considered recommendations, the welder's part in the final result must also be given its just due. It is even more important to have good penetration and freedom from slag inclusions and air holes in welds subject to dynamic loads than in the welds with which we have heretofore been familiar. A weld is only as good as the welder.

An Issue Narrowed Down

THE RELATION of the federal government to municipal operations that are financed by the PWA is clarified by the Fourth Circuit Court of Appeals in its ruling in the Duke Power Co.'s suit to prevent construction of the Buzzard's Roost hydro-electric plant by Greenwood County, S. C. The court stated that all the PWA proposed to do was to make a loan and grant to Greenwood County to enable it to engage in an enterprise which, as a subdivision of the state, it has been given the right and power to engage in. The court said further that it was unable to see how the lending or giving of money to a state agency for such a purpose can be said to encroach upon the state's powers. The county, the court said, will not infringe any right of the Duke Power Co., for competition by a county or municipality does not violate any right of a public service corporation which has no exclusive franchise. This ruling, if sustained in the Supreme Court—which appears highly probable—eliminates questions of the constitutionality of the federal public works acts from consideration in the many suits now pending to prevent construction of municipal power plants or distribution systems, and narrows the issue down to the local question as to whether or not the projected plant or distribution system violates rights of the local public utility company.

Fact Corrects Rumor

SOME MONTHS AGO a rumor circulated that serious failures had occurred in the floor of the Smithfield St. Bridge in Pittsburgh, whose revolutionary aluminum alloy floor structure and deck plate were put in place only a few years ago. The rumor said that a number of serious breaks caused by intergranular corrosion had occurred and that the floor as a whole was rapidly going to pieces. A quite different picture is given by the facts of the case, as reported in this issue by Henry D. Johnson, Jr., chief engineer of the city's department of public works and as such responsible for the maintenance of the bridge. His account shows that the cracks and breaks in the stringer flange angles resulted from improper seating of track ties, which subjected the metal to repeated bending beyond the elastic limit. No indication of intergranular corrosion was found. In short, what happened is quite the same as the cracking and splitting that frequently develops in steel stringers and floorbeams subjected to the same kind of loading. Thus, in so far as the case throws light on the structural value of aluminum alloy, it is favorable in showing that the floor has gone through several years of hard service without any of the troubles that might be expected to develop in the case of a new material. The case is valuable in repeating the old lesson of the need of careful work in those parts of structures that are subject to distortion and the necessity for careful, frequent inspection.

Sanitary Fill Effective

AFTER STRUGGLING with the refuse-disposal problem for more than a quarter of a century, sometimes desperately, San Francisco finally has developed a "sanitary fill" program which, as the sequel to two or three years' working success, has now been given official sanction in the form of a ten-year franchise. General interest in the case centers mainly on the special conditions that make the fill disposal method applicable at San Francisco. A site was found for the disposal operations that offers several advantages, the lack of any one of which might make the program unsuccessful. First, the location is on the edge of the bay, where prevailing winds blow from the land over a long stretch of water; this minimizes odor nuisance, provides convenient drainage discharge and greatly lessens trouble from wave action—protection against wave action might be required if prevailing wind conditions were reversed, as they would be were the fill on

the east side of the bay instead of the west side. Second, tide flats were available where filling would be an advantage to the land. Third, on one edge of the area is a steep hill affording an ample supply of material of exactly the quality required. Because of this hill, cover is available at moderate cost and in sufficient amount to permit of building truck roadways across the filled area. If there had been no rock in this cover material, some entirely different plan would have been required for continuing truck and tractor operations in winter. As it is, the site affords almost ideal conditions, and a highly satisfactory fill is being made, meeting all requirements of health and sanitation. This is a happy outcome of a long period of uncertainty in which the city continued operation of an outmoded and overloaded Thackeray incinerator, experimented with other methods and considered disposal by dumping at sea. San Francisco is to be congratulated on finding so satisfactory a solution of its refuse-disposal problem.

Consolidation in Canada

CANADIAN ENGINEERS are moving rapidly toward consolidation of their technical and professional activities. A year ago the Engineering Institute of Canada appointed a new committee to study the subject of consolidation of the activities of the Institute with those of the provincial associations of professional engineers. After an intensive study, including an analysis of replies to an elaborate questionnaire sent out to both the local branches of the institute and the provincial associations, that committee submitted a favorable report to the Institute at its annual meeting at Hamilton on Feb. 5. On the basis of full consideration of the subject, the members present adopted a resolution calling upon the council of the Institute to continue active steps looking toward consolidation or confederation with the provincial associations, thus bringing the technical and professional activities of most of the engineers of Canada under unified control.

In Canada the provincial associations of engineers have a legal status, admission to membership in them being required of all who wish to practice engineering within the province. The Engineering Institute, on the other hand, is a voluntary technical society, and though predominantly civil attempts to cover all technical activities and does so except for the activities of a few local sections of the American technical societies.

The present decision to work for consolidation is significant chiefly because the evidence brought forth at the Hamilton meeting indicates that most of the Canadian engineers believe that professional and technical activities can and should go hand in hand. But consolidation is not yet an accomplished fact. On the one hand, any definite action that affects the fundamentals of the Institute set-up cannot be taken without a letter-ballot canvass of the membership, and many of the conservatives who have opposed the movement are in influential positions. On the other hand, the provincial association cannot be expected to yield to the objections of the die-hards. Nevertheless there appears to be a strong sentiment for consolidation both in the institute and in the professional associations—with the younger and more aggressive men as its chief proponents. As a result, the deadlock of years' standing that has prevented active exploration of the possibilities of consolidation is broken.

What is taking place in Canada with respect to consolidation cannot but cause speculation as to the possibility of similar action here, where the difficulties that stand in the way of it are much greater. Is such closer integration of professional and technical activities desirable or practical? Is progress to be toward more highly specialized technical societies and the gradual disintegration of the older technical societies? If so, will such societies be purely technical, or will they attempt to handle the professional problems of the groups as well? If the former, will there continue to be enough professional matters of active interest to keep purely professional state or national associations alive?

Briefly, the question at bottom is whether centralization is to become the keynote of the profession's organization, or whether the organization shall continue to adapt itself to local and group conditions. In the technical field, the trend toward the latter is unmistakable, at least on this side of the line. But what of the professional field of activity and its interrelation with the technical?

A strong confederation combining all purposes requires that local branches shall have charge of all professional matters and local technical affairs, while the national organization concerns itself only with fostering the study of those subjects that know no geographical limitations. It is toward this latter objective that the Canadians now appear to be striving. Their success or failure will be followed with interest here.

Keeping the Roads Open

TRANSPORT this winter has made a memorable record in its continuous battle of sixty days against blizzard and snow. In the northern Mississippi valley, where storms have been most severe, road and railway repulsed day after day the onslaught of snowfall, high winds and subzero temperatures almost without precedent in their simultaneous occurence. On 80,000 miles of main highway and 60,000 miles of railway in the eight midwest states reporting in this issue traffic moved on three-quarters of the mileage within 48 hours after any storm, including the blizzard snowfall of Feb. 8 and 9, which blew the accumulated snows of two months into new drifts that blocked every highway and railway.

The story of this accomplishment, told in the present issue, deserves attention as a marked example of efficiency in operating organization. In railroad service we have long been accustomed to such prompt efficiency, but in highway service it is new, because the need for it is new. The demand for continuously open highways in winter is hardly more than a dozen years old, and only recently have snow-removal forces and equipment taken a place of recognized importance in road-maintenance organizations. Now they are universal. As the present story shows, they vie with the proficient maintenance divisions of the railways in quick mobilization and skilled attack. Without these the current winter would have brought wide paralysis of highway transportation and extensive hardship or even distress in the storm regions.

Inconspicuous in their day-to-day work, maintenance organizations of railways and public roads this winter are performing a task that claims everyone's recognition and praise. Such acknowledgement has been long merited; on the showing of the last few weeks it can no longer be denied.

CURRENT NEWS

Plan for Northwest Power Agency

Regional planning group submits report on Columbia Basin advocating public corporation rather than TVA set up

CREATION by Congress of a Pacific Northwest Power agency, different in organizational framework from the TVA, was recommended in a report released on Feb. 19 by the Pacific Northwest Regional Planning Commission. The report was submitted to President Roosevelt through the National Resources Committee which reserved comment on the report pending further study, but stated that the desirability of early public discussion of the problem made its immediate release advisable as a basis for general consideration and possible Congressional action during the present session.

The planning committee recommended that a public corporation be created to develop the transmission and sale of hydro-electric power in the Columbia Basin. A general conclusion reached was that an organizational framework equivalent to the TVA is not best suited to the Columbia Basin. The committee reported that the agency established for the transmission and sale of power should not be financially burdened with other types of service which are incapable of direct self support.

Sentiment preponderantly unfavorable to adoption of a Tennessee Valley Authority type of administration for federal power developments in the Northwest had been expressed at the hearings conducted by the regional planning commission at Portland, Ore., last November (*ENR*, Nov. 7, 1935, p. 654). This was one of seven such hearings held in different cities in the four states embraced by the commission: Oregon, Washington, Idaho and Montana.

Region awaiting development

The report was prepared at the request of the President for information to assist in determining the most suitable agencies for the planning, construction and operation of public works in the region and for advancing the development of the Columbia River. In addition to its recommendations concerning the type of organization, the commission pointed out in its recommendations and findings that the Pacific Northwest is a region of great promise awaiting full development. Water, land, minerals, forests and power are ample to warrant public works now authorized and a continuing public works program controlled by advance planning. This planning should be continued along lines now established, with provision for more permanent legal basis and for effective coordination of federal agencies and state and local government. The commission also recommended that, in general, construction of public works should be continued under the auspices of the agencies now engaged. This recommendation refers more specifically to the Corps of Engineers and the Bureau of Reclamation.

Other recommendations and findings are that federal power plants now under construction or to be constructed should be considered as units in a single integrated power system and that a change in the basic economy of the region is to be expected. This basic change will be brought about by the fact that more than 40 per cent of the undeveloped hydro-electric energy of the nation lies in this region and because of its availability both light and heavy industry will play an increasingly important part of the development of the area. Large quantities of power to be made available will be used not only for industrial purposes, but also for domestic, farm and other uses which would raise living standards. An increased industrial population of 200,000 workers will mean 600,000 greater population dependent upon industry, 400,000 on farms and 1,500,000 in commerce, transportation, construction and other service activities. The assumption of a total population increase of 2,500,000 is predicted as well within the possibilities for the future.

New York Silicosis Law Would Require Control Devices

A bill has been introduced in the New York state legislature that would revise the all-inclusive occupational disease compensation act, effective last Sept. 1, in respect to silicosis and other dust diseases. The bill would make mandatory the use of approved dust-eliminating devices on all public works, including highways and construction, both indoors and outdoors. In addition, the Industrial Commissioner would be directed to amend the Industrial Code to require the use of approved devices to eliminate dust in all industries where silica or other harmful dusts are present. The bill also limits the compensation to be paid for silicosis cases to $3,000 maximum. Any case claimed during the first month the act is in effect would pay only $500; each month thereafter the maximum is raised $50 until $3,000 is reached. This feature is to protect the insurance carriers against a rush of claims at the start, and to allow a reasonable experience to develop before the financial burden becomes a maximum. It is believed this plan will prevent the setting of high premium rates pending loss experience. Partial disability cases from silicosis will not be considered, total disability or death alone warrants silicosis compensation.

Other features of the bill provide for a campaign of prevention of silicosis, $75,000 per year to be spent for this purpose, the establishment of a medical consulting board, and the prohibiting of compulsory pre-employment medical examination of workers. An appropriation of $100,000 is asked for immediate administration expenses.

The bill is the product of more than five months of conference between representatives of employers, employees, insurance carriers and the State Industrial Board.

PWA Power Grant Upheld by Court

Injunction against the use of PWA funds for Greenwood County, S. C., power plant refused by Court of Appeals

AN INJUNCTION asked by the Duke Power Co. against the erection, at Buzzard's Roost, with PWA funds, of a $2,852,000 hydro-electric power plant by Greenwood County, S. C., was denied by the U. S. Circuit Court of Appeals on Feb. 22 in an opinion reversing a previous decision by district judge H. H. Watkins, (*ENR*, May 16, 1935, p. 720). The decision denying the injunction was handed down with two justices assenting and one dissenting.

The majority opinion held that the Public Works Act was passed in accordance with the constitutional rights of Congress and that PWA Administrator Ickes was not violating his lawful authority in approving the loan and grant. It was also held that even if there were a question of constitutionality that the plaintiff had no suit because "no right of the plaintiff would be invaded either by the county in the building of the power project or by the administrator in the making of the loan."

Plaintiffs rights not infringed

In discussing the plea for injunction, the opinion held that the plaintiff would not be entitled to an injunction because no legal right would be infringed by any proposed action by the county or by the PWA Administrator. The court held "It is thoroughly settled that competition by a county or municipality violates no right of a public service corporation doing business therein, which, as in the case of the plaintiff here, has no exclusive franchise."

That the administrator's action would in no wise invade or curtail the rights of the state was pointed out in the decision. Furthermore, such loan and grant would furnish the state with a means of exercising a power it already has, according to the court, which declared that "We do not think that it can be said that Congress is invading the reserved powers of the state or is making expenditures for matters essentially local in character, merely because the project for which the expenditure is made is not connected with interstate commerce, and when considered alone is local in character. It cannot be said to invade the reserved powers of the state to make loans or grants to municipal corporations which the state continues to control and which are at liberty to reject loans or grants if they see fit to do so.

No encroachment on state power

"Greenwood County is but an agency of the state of South Carolina and remains subject to control by that state in the management of its power project as well as in other matters. The rates to be charged by public utilities remain subject to state control. All that the administrator pro-

pose to do is to make a loan and grant to the county to enable it to engage in an enterprise which, as a subdivision of the state, it has been given by the state the right and power to engage in.

"In other words, the administrator's action will not in any sense limit the powers of the state but will furnish to the state the means of exercising a power which it already possesses, i.e., the power of engaging in public business for the benefit of its citizens. We are unable to see how lending or giving money to a state agency for such a purpose can be said to be an encroachment on state power."

Public Works Act constitutional

Congressional power to pass the Public Works Act was declared by the court to be found in the first article of the Constitution. The opinion said, "We think the enactment of these provisions of the statute was well within the powers of Congress. It may be conceded that, under ordinary circumstances, the power would not exist to extend and raise funds for construction local in character and not connected with the exercise of powers of regulation expressly conferred upon the federal government; but the circumstances under which the statute was enacted were by no means ordinary, and the construction contemplated was not of an isolated project but of a vast program of public works intended to relieve a condition of unemployment which was nation-wide in scope and had become a menace, not merely to the safety, morals, health and general welfare of vast numbers of people, but also to the stability of the government itself."

This majority opinion was handed down by judges John J. Parker and Elliott Northcott. In his minority opinion, Judge M. A. Soper questioned the right of the federal government to exert a regulatory power in a local field on the ground that it is only an incidental result of the laudable effort under the general welfare clause to put an end to unemployment. Judge Soper also held "The public utterances of the administrator show beyond doubt that his loans and grants on municipal power projects would reduce local utility rates.

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Fort Peck Shivers

During the first 22 days of February the maximum temperature at Fort Peck Dam ranged from minus 1 deg. to minus 32 deg.; the minimum ranged from minus 12 to minus 54, all official readings at the weather bureau in the town of Fort Peck. Unofficial temperature at the dam the morning of Feb. 15 was 61 deg. below zero. The extreme cold has hampered all outside work, including resumption of control shaft excavation on the four diversion tunnels and the changing of the land lines of the dredging plant. Only work within the tunnels continued uninterrupted.

Decision has been made to build the long dike that will extend 11,000 ft. westward from the main dam by the hydraulic fill method. In anticipation of building the dike during the coming dredging season one of the rail-mounted land booster pumping plants has been dragged up to the top of the west abutment of the dam. The dredge "Jefferson" has been assigned to the dike job, and pipelines are now being laid connecting her floating booster with the land booster on the hill and on to the site of the dike.

Adverse Weather Grips Country

Usual cold weather with heavy ice and snow blanket causes apprehension of spring floods if heavy rains come next month; most of country suffers in continued cold wave

Washington Correspondence

THE present cold spell is one of the longest and most severe ever experienced. Freezing temperatures have covered the entire United States, except parts of Florida, extreme southwestern districts and the Pacific Coast for four weeks. In some northwestern districts all previous records for continuous cold have been broken. As far south as Nebraska the minimum temperature has been below zero daily for a month, exceeding all previous records. In other north central sections the most prolonged period of subzero temperatures on record also has occurred and the zero line has thrust down into the Texas Panhandle, Oklahoma, southern Missouri, Tennessee and Virginia.

The extent and depth of the snow cover is equally remarkable. The southern snow line shifts slightly from week to week, crossing North Carolina into northern South Carolina and northern Georgia, Tennessee, northern Arkansas and Kansas and dipping into New Mexico and Arizona. North of this variable line the amount of snow ranges from a mere trace to twenty inches over wide areas and much greater depths in northern districts and high elevations.

Drifting with high winds, snow in the midwest and most northern sections has blocked traffic, closed schools and shut off fuel supplies. Many farm families have been isolated. Apart from widespread distress and difficulty in maintaining rail and road transportation, the increasing blanket of snow is causing much popular apprehension regarding floods when the cold wave finally breaks.

Rains may bring floods

Floods are likely to occur, in the Weather Bureau's opinion however, only if thawing is followed by heavy rains next month. Heavy rains on the melting snow will produce a flood in the lower Mississippi but the probability is that the heavy burden of snow and ice will move off without trouble as it did in early 1918. In that year the Mississippi River and its tributaries were choked with ice from Memphis up. The gorging was the worst within memory. The snow blanket also was heavy, although not as great as this year. The entire mass moved downstream without trouble, except for a moderate flood of the Ohio River. No flood stages were reached during the year in the upper Mississippi or in the Missouri. In fact, Weather Bureau records show that there has never been a flood in the Missouri below Sioux City that was due to snow.

Snow as flood cause overestimated

Snow as a cause of floods east of the Rocky Mountains usually, according to Montrose W. Hayes, principal meterologist of the Weather Bureau, is given much more weight than it deserves. Snow melted by temperature alone rarely causes trouble but heavy rains falling on snow are likely to produce floods, largely in proportion to the heaviness of the rain.

In the Mississippi River valley snow above Cairo is unusually heavy but in the absence of heavy rains this is expected to melt and run off with no more than local damage caused by gorges when the ice breaks and begins to move under the influence of mild weather. Rains this month will cause at least moderate flooding in the Ohio and other tributaries but are not expected to be serious because present stages in both upper and lower Mississippi and its tributaries are low for the season, except in the lower Ohio, and even there they are considerably below bankfull. Heavy rains next month, however, on top of melting and snow and rains this month, would produce a flood in the lower river. The possibility of a wet March, therefore, is a condition that, according to the Weather Bureau, may be regarded with some concern, although there is no cause for alarm at present. Unfortunately, the Bureau cannot say whether March will have more or less rain than usual and so is unable to predict whether or not a flood will occur in the Mississippi this spring.

Data on the ice and snow blanket over the country are collected each week by the Weather Bureau. The accompanying table was compiled from Feb. 10 figures, the latest available at the time of going to press.

SNOW AND ICE COVER, FEB. 10, 1936

Locality	Snow depth	Ice thickness
ATLANTIC COAST		
Greenville, Me.	35	21
Portland, Me.	14	*
Burlington, Vt.	9	18
Holyoke, Mass.	19	13
Hartford	12	12
Binghamton	8	*
Harrisburg	12	18
Reading	12	20
OHIO VALLEY		
Elkins, W. Va.	2	0
Pittsburgh	4	2
Cincinnati	Trace	†
Terre Haute	1	15
LAKE REGION		
Oswego	20	19½
Rochester	8	14
Erie	3	20
Cleveland	Trace	16½
Chicago	4	..
Alpena	18	26
Detroit	3	6
Escanaba	11	24
Grand Rapids	18	..
Saulte Ste. Marie	18	21
Green Bay	20	12½
Milwaukee	18	..
Duluth	17	31
UPPER MISSISSIPPI		
Minneapolis	14	24
La Crosse	17	21
Davenport	8	22
Des Moines	13	13
Peoria	5	14
St. Louis	1	‡
MISSOURI VALLEY		
Kansas City	1	12
Topeka	2	..
Omaha	14	22½
Huron, S. D.	12	26½
Moorhead, Minn.	12	34
Devils Lake	12	..
MOUNTAIN REGION		
Belton, Mont.	35	..
Helena	6	..
Casper, Wyo	10	..
Denver	Trace	..
Flagstaff, Ariz.	Trace	..
Logan, Utah	13	..
Salt Lake City	8	..
Idaho City	45	..
Spokane	8	..
PACIFIC COAST		
Paradise Inn, Wash.	154	..
Lakeview, Ore.	10	..
Portland	0	0
Huntington Lake	41	..
Soda Springs	97	0

*Shore ice. †Floating ice. ‡Ice gorged.

Weather Closes Highways To Heavy Trucks

Unusual weather condition have caused the North Carolina Highway Commission to close for a period of 30 days all bituminous-surfaced roads in North Carolina, prohibiting the use of these roads by trucks of more than 5 tons gross weight. The highway commission has estimated that weather conditions have so far caused damage of about $3,000,000 and at the same time have reduced considerably the income from gasoline taxes. The order affects about 3,700 miles of state highway which, according to the highway commission, is in such poor condition because of the weather that to use heavy trucks would soon lead to extensive damage of the road. A similar order by the state highway commission of Virginia also prohibits the use of trucks weighing more than 5 tons on the bituminous highways of that state.

Lee G. Warren Becomes TVA Project Engineer

Lee G. Warren, who had only recently been appointed construction engineer in charge of the Chickamauga Dam to be built by the Tennessee Valley Authority at a cost of $32,000,000, has now been promoted as project engineer on this work. Mr. Warren had been construction manager for the Frederick Snare Corp. at Tygart Dam, also being built for the TVA, before his selection as construction engineer at Chickamauga Dam. Associated with the Dixie Construction Co. and the Phoenix Utility Co., in the past, Mr. Warren has built many of the large dams in the South and Southwest.

Series of Dams Suggested for Connecticut River Control

Construction of ten dams and reservoirs on tributaries of the Connecticut River, with local agencies providing the necessary land and flowage rights and assuming half of the cost of construction, is recommended in a report to Congress by the Board of Engineers for Rivers and Harbors and concurred in by the Chief of Engineers.

The program thus approved comprises part of a more comprehensive plan recommended by the District Engineer after a thorough study of the Connecticut River basin. It was found that this stream is frequently subjected to destructive floods and that the only feasible method of control is through the construction of storage reservoirs on its headwaters. Ultimately it is recommended that 33 of these be constructed, with a total storage capacity of 931,000 acre-ft. The total cost of these would be $41,083,000, with annual charges amounting to $2,875,000. Annual benefits of this program are estimated at $294,000 reduction in flood damages and $2,320,000 in additional recoverable power. However, under present conditions there is no market available for the power, nor could it economically be developed.

While approving the comprehensive plan as an ultimate goal, the board feels that present conditions justify no more than a small preliminary program, which involves a construction cost of $13,373,000, including land and water rights, for ten reservoirs with a total storage capacity of 352,500 acre-ft. The annual cost of this limited program is set at $697,000, while the annual benefits to be derived are estimated as reduction in flood damages, $180,000; increased returns to present power plants, $300,000; potential returns on other power sites, $158,000; total, $638,000.

While these figures indicate that the proposal is not economically justified, it is believed that the intangible benefits are sufficient to weigh the balance in its favor, providing that local interests assume half of the construction costs and agree to operate the reservoirs upon completion. The report suggests that local cooperation could be provided by the formation of conservancy districts empowered to negotiate agreements for the use of water and levy local assessments for benefits. Construction could proceed step by step as the local organizations perfect their plans for participation.

The report also goes into a proposed change in the navigation channel from Hartford to Holyoke, authorized by Congress in 1935. The proposal to change the low-water depth from 12 to 15 ft., and for the federal government to assume the cost of a dam at Enfield Rapids, now the responsibility of local interests, received an adverse recommendation.

John F. Stevens Honored By New York Engineers Club

John F. Stevens was unanimously elected to honorary membership in the Engineers Club, New York, by the board of management of the club at a meeting held on Feb. 13. Other honorary members of the club are Herbert Hoover, Owen D. Young, Elihu Thomson, Charles A. Lindbergh and Ambrose Swasey. Mr. Stevens also is an honorary member of the American Society of Civil Engineers, Western Society of Engineers, North Carolina Society of Engineers, the Franklin Institute, and the Engineers Club, Baltimore.

A. J. Post, Head of Firm Of Steel Constructors, Dies

Andrew Jackson Post, president of the firm of Post & McCord, Inc., New York, died at New York on Feb. 25 following a brief illness. Mr. Post was 64 years old.

Mr. Post was born in Jersey City, a son of the late William H. Post, founder of the firm of Post & McCord. He graduated from Stevens Institute of Technology in 1892 as a mechanical engineer and immediately went to work with his father's firm. Following the death of his father, Mr. Post was made president of the firm in 1912. In that capacity he directed the affairs of the organization during the years in which it erected the steel frames of such notable buildings as the Empire State Building and the Chrysler Building.

Mr. Post was active in the affairs of the New York Building Congress and the American Institute of Steel Construction. He also was a member of the American Society of Civil Engineers.

Fresno Dam Construction To Begin Soon

The construction of Fresno Dam, on the Milk River reclamation project in Montana, will, according to reports from the Bureau of Reclamation, begin as soon as repayment contracts calling for the use of 80 per cent of the water to be stored have been signed by water users in the area. The Reclamation Bureau will retain title to 20 per cent of the water for sale under contract in the future to areas in need of supplemental supplies. A PWA allotment of $2,000,000 has been made available to the Bureau for the construction of the dam. R. F. Walter, acting commissioner, has notified the Denver office to proceed with the preparation of specifications. W. J. Burke, the Bureau's district counsel at Billings, Mont., has been instructed to draw up the formal contracts with the Fort Belknap, Malta and Glasgow irrigation districts.

Newly Built Roof Collapses In Montreal

A portion of the newly completed roof of an armory being constructed for the Royal Canadian Hussars regiment, in Montreal, collapsed in the early morning of Feb. 19. Although considerable damage was done to the interior finishing work, no workmen were injured, as warning of the collapse had been given before the failure actually occurred.

The roof of the armory is formed of three hinged steel arches, supporting light steel truss purlins, which in turn support a timber deck. The section of roof which collapsed represents about five per cent of the total roof area, and only timber deck and steel purlins were affected, the steel arches having suffered no distortion or damage of any kind. The failure is being investigated.

Montreal has recently had unusually heavy snowfalls, and the roof at the time was carrying about six feet of snow (possibly 120 pounds per sq.ft.).

The building is being constructed by the federal government as one item in the recently projected public works program. A. F. Byers, Ltd., of Montreal, are general contractors, and Ross and Macdonald, of Montreal, are supervising architects for the Department of Public Works, Canada. T. W. Fuller, Chief Architect, Ottawa.

Interstate Sanitation Group Elects Officers

At a meeting of the recently created Interstate Sanitation Commission on Feb. 22, the following officers were elected: Joseph P. Day, chairman; J. L. Eisner, vice-chairman; Gerald Knight, secretary, and J. S. Smith, treasurer. The commission was created by a compact between the states of New York, New Jersey and Connecticut, with Congressional authorization. Both New York and New Jersey legislatures have ratified the compact to end pollution in the waters in the metropolitan area. It is expected that the Connecticut state legislature will ratify the compact at its next session

New Jersey Highway Bidders Subject to New Regulations

Under new rules issued by the New Jersey state highway commissioner, all contractors bidding on highway work in that state will, after April 1, be required to answer a questionnaire designed to classify them according to the type of, and amount of, work on which they are entitled to bid. The statement, which is to be furnished under oath by the contractor, will determine financial ability, adequacy of plant and equipment, organization and prior experience. Qualification statement must be filed at least 20 days before the date set for receiving bids on any project. Once the statements have been filed and the bidder classified, such classification holds good for six months, except for bidders on work in the unlimited class.

There are five classes, depending upon the type of work performed, to which the bidder may be assigned. After he has been classified according to the type of work on which he may bid, he is further classified according to the amount of the contract on which he may bid. The type classifications are: general construction (any work ordinarily done by the highway department); grading (grading and drainage structures); paving (grading, drainage structures, and paving); bridge construction (bridges, viaducts and other similar structures); special miscellaneous work (other types of work not regularly undertaken by the highway department, such as painting, landscaping, test borings).

There are 22 cost classes ranging from work under $50,000 to that over $2,000,000. The first nine classes are from $50,000 to $250,000, with a $25,000 range between each class. Above $250,000 the class range is $50,000 to as high as the $500,000 class. The next three classes increase by $100,000 each. The classes above $800,000 are: $1,000,000; $1,250,000; $1,500,000; $2,000,000, and unlimited. Bidders qualified for the unlimited class are to be notified of the intention to carry out such a project, and each such bidder must specially requalify 20 days before bids are received.

Prospective bidders will be classified for one or more types of work and bids will be accepted only from persons qualified in accordance with the classifications. Bidders who are dissatisfied with their classification may request hearings before the commissioner and present further evidence to justify different classifications.

OREGON COAST HIGHWAY BRIDGES

The group of five large bridges, being built on the Oregon Coast Highway, is rapidly nearing completion. The pictures here shown are of the Siuslaw River Bridge (above) with the central bascule span in place, and (below) the Coos Bay Bridge with arch spans up to 277 ft. span and a central steel cantilever span of 793 ft. and a total length of 5,337 ft.

Unify Chicago Rail Services to Save Ten Million a Year

A saving of $10,500,000 annually is estimated possible to the railroads entering Chicago if consolidation were carried out of freight and passenger terminals and facilities as suggested by V. V. Boatner, chairman of the Chicago terminal coordinating committee, in a report submitted to the Western Regional Coordinating Committee reporting to J. E. Eastman, federal coordinator of transportation.

Under the plan proposed passenger stations would be reduced from six to four, the Grand Central and Dearborn St. stations to be eliminated. The North Western station would be used for suburban service only, all through trains now entering it to be served in the Union Station. Mr. Boatner suggests that the city acquire various elevated rights-of-way vacated for use of superhighways. Major freight yards, numbering 21, would be reduced to eight, industrial yards reduced to eighteen and freight houses consolidated with those retained following the groupings in major yards. The eight freight yards to be retained are Bensenville-Proviso, Cicero, 59th St., Clearing, Blue Island-Gibson and Markham.

Savings are listed as follows: Major freight yards, $3,480,000; industrial yards, $956,000; industrial shipping, $486,000; transfer and interchange, $3,170,000; LCL operations, $2,762,000; passenger, $614,000; maintenance of way and structures, $255,000. From these savings would be deducted $876,000 for engine time to meet new service requirements and $350,000 for 5 per cent carrying charges on new construction of $7,000,000.

Engineers Meeting Postponed Because of Weather

Iowa Engineering Society scheduled for Feb. 12 to 14 at Marshalltown was postponed indefinitely on account of extremely cold weather and condition of highways and railroads. Likewise the Feb. 11 meeting of Iowa Section American Society of Civil Engineers was cancelled because of extreme weather conditions.

Little Rock, Ark., to Acquire Water System

The city of Little Rock, Ark., will take over operation of the Arkansaw Water Co. as a municipally owned plant on March 1. The city is paying the American Water Works & Electric Co. $3,850,000 for the company's Little Rock distribution system and an additional sum for inventory and accounts receivable. The purchase is being made in part with the aid of a PWA loan and grant of $7,074,500, of which $3,080,000 is to be used for the construction of a new water supply (*ENR*, Dec. 26, 1935, p. 899).

Contract Need Not Be Awarded to Lowest Bidder

The Colorado state executive council, composed of Governor E. C. Johnson and other elected state officers, has the power to award contracts to whom it chooses, regardless of whether that contractor is the low bidder, according to a decision handed down by District Judge C. C. Sackman in Denver, Feb. 10. The decision came as the result of a suit brought before the court on an application for a writ of mandamus to compel the council to award the contract to a plumbing company on its low bid. The executive council awarded the contract to another concern after union labor leaders had protested that the low bidder had been unfair to organized labor.

Avalanche Buries Highway Taking Three Lives

The highway leading through Snoqualmie Pass, in the Cascade Mountains, about 50 miles east of Seattle, Wash., was, on Feb. 23, buried under an avalanche. Three bodies have been recovered from under the snowslide according to reports, and it is believed that other motorists were trapped in the pass. The road here is in a heavily forested region where the slopes are so steep that snow fences would offer no protection from slides and where snow sheds are not used. Snowfall near the summit of the pass is too heavy to permit keeping the road open continuously, but each time the road is blocked snow removal equipment is immediately put to work.

Davenport Bridge Traffic Thousand a Day

The new $1,500,000 bridge over the Mississippi River connecting Bettendorf, Ia., with Moline, Ill., for the 72 days from its opening Nov. 19 to Jan. 31, passed 63,366 passenger cars, 7,920 trucks and 2,354 pedestrians. Tolls are 15c. each for cars and trucks (including drivers) and 5c. for pedestrians. Income was $10,092.25 and operating expenses $5,781.30. Accrued interest to Jan. 31 on $1,200,000 Davenport bridge revenue bonds was $24,000. This was a PWA project with a $238,000 grant.

Montreal-New York Waterway Discussed by Commission

At a special meeting of the International Joint Commission held Feb. 17 in Washington the principal topic discussed was the proposed waterway from Montreal to New York City by way of Lake Champlain and the Hudson River. A provision in the last Rivers and Harbors Bill requested the commission to make a study of this project and report to Congress on its feasibility. Last week the commission heard preliminary reports by Col. J. N. Shulz, Captain J. C. Marshall, J. D. Myton and J. S. Berkley, of the Army Engineers. The commission reached no conclusions, but directed that the study be continued and a further report submitted at its semi-annual meeting to be held in Washington April 7.

The recent meeting marked the accession to the chairmanship of the Canadian Section of Charles Stewart, formerly premier of Alberta and Canadian minister of public works, who succeeds Charles Magrath, who held that post for 25 years.

Ontario Plans Improvement Of Highways By Widening

As part of a construction program to be initiated this spring, provincial highways in the more settled parts of Ontario will be rebuilt and improved. The Department of Highways has announced that the first part of the development will be the widening of Highway No. 2 for about 280 miles. Existing 18 and 20-ft. surfaces will be duplicated, with new traffic lanes separated from the present ones by park strips. Curves will be removed as far as possible, and grades lessened. Work is expected to start this spring on the section of the highway between Toronto and Port Credit, 11 miles west. The program has been adopted, according to Hon. T. B. McQuesten, Minister of Highways, because of the success of the division of traffic lanes, where it has been tried in the United States, and because of the desirability of increasing the capacity of the more densely traveled roads in this province.

SOCIETY CALENDAR

AMERICAN RAILWAY ENGINEERING ASSOCIATION, annual meeting, Chicago, Ill., March 10-12.

AMERICAN WATER WORKS ASSOCIATION, annual meeting, Los Angeles, Calif., June 8-12.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

AMERICAN SOCIETY FOR TESTING MATERIALS, regional meeting, Pittsburgh, Pa., March 4, and meetings of Committees, March 2-6.

NEW YORK SAFETY CONFERENCE, 7th annual meeting, New York City, March 3-5, 1936.

NEW JERSEY MOSQUITO EXTERMINATION ASSOCIATION, annual meeting, Atlantic City, N. J., March 4-6.

NEW JERSEY SEWAGE WORKS ASSOCIATION, annual meeting, Trenton, March 19-20.

KENTUCKY-TENNESSEE SECTION, AMERICAN WATER WORKS ASSOCIATION, Lexington, Ky., March 23-25.

NEW YORK SECTION AMERICAN WATER WORKS ASSOCIATION, Oswego, N. Y., March 26-27.

FLORIDA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual meeting, Tampa, March 31-April 1.

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Lafayette, Ind., April 7-9.

Delaware River Power Plant Refused Preliminary Permit

Rejection of an application for a preliminary permit covering a proposed hydroelectric power development on the Delaware River, comprising three dams in the vicinity of Tucks Island, Belvidere and Chestnut Hill, N. J., has been announced by the Federal Power Commission. The project was sponsored by the Electric Power Co. of New Jersey, Inc., Trenton. It proposed the installation of 176,000 kw. generating capacity. The commission found that the application did not contain a satisfactory statement of the work proposed to be done under the requested preliminary permit.

Air Hygiene Foundation Holds First Meeting

The Air Hygiene Foundation of America, Inc., held its first annual meeting in Pittsburgh, Pa., on Feb. 11, and discussed the betterment of dust conditions in various industries. Committee reports were read on various phases of the work.

The medical committee reported on the collection and evaluation of available information concerning industrial dust diseases and described the research work now being carried on.

Connecticut Engineers Hold Annual Meeting

The Connecticut Society of Civil Engineers held its 52nd annual meeting Feb. 18-19 at Hartford, Conn. Certificates of honorary membership were awarded to Charles F. Scott and to E. L. Taylor, chairman of the Connecticut Public Utilities Commission. Caleb M. Saville received the award for the best paper, which was "Water Supply of the Hartford Metropolitan District."

Speakers at the two day meetings included: Warren J. Scott, director of the Bureau of Sanitary Engineering, Connecticut Department of Health; Charles S. Farnham, associate professor of civil engineering, Yale University; Frank Edward Winsor, chief engineer, Metropolitan District Water Supply Commission, Mass.

Cleveland Exposition Plans Well Under Way

Work on the plans for the Great Lakes Exposition to be held in Cleveland, Ohio, June 27 to Oct. 4, is progressing rapidly, according to a report from exposition headquarters. The exposition is to cover an area of 125 acres on the downtown Cleveland lake front and will feature, among other things, an international village. The entrance, which will be built on the Mall near the public hall, is to be 400 ft. wide and to be ornamented with pylons 70 ft. high. It is being designed by Anthony Ciresi who was awarded the work as the result of an architects' competition.

Obituary

ROBERT S. GLOVER, a road contractor of Greenup, Ky., died there Feb. 6. He was 55 years of age.

JOHN A. MORTON, former commissioner of public works and city engineer at Santa Monica, Calif., and founder of the Los Angeles County Association of City Engineers, died Jan. 29 at his home in Santa Monica. He was 74 years of age. He recently had been elected honorary vice-president for life of the Regional Planning Conference. His first engineering service was with the Southern Pacific Ry. and the California state engineer's department. He was appointed city engineer for Santa Monica in 1914.

JOSEPH BALDWIN, who had been connected with the U. S. Engineers for eighteen years, died in Memphis, Tenn., Feb. 5, at the age of 61.

JOHN M. BOLAN, retired contractor of Cincinnati, died at his home in that city Feb. 18, at the age of 73. Mr. Bolan at one time served as assistant city engineer.

WALTER F. HAAS, 66 years of age, Los Angeles attorney and an outstanding authority on California water laws, died Feb. 17 at his home in Alhambra, Calif. During a long career in southern California he served as city attorney for Los Angeles, Alhambra and Sierra Madre.

ARTHUR BISHOP SHEPARD, president of the contracting firm of Arthur Shepard

Co., New York City, died at his home there on Feb. 5, at the age of 64. Mr. Shepard had been president of the company since 1925.

PATRICK J. KEOGAN, city engineer of New York during the World War period, died at Rockville Center, N. Y., on Feb. 18. Since his retirement from the service of the city, Mr. Keogan had been at the head of an electrical contracting business in New York.

JOSEPH A. TOMASELLO, head of A. G. Tomasello, Inc., Boston, died at the Massachusetts General Hospital on Feb. 21 following a brief illness. He was born in Italy 48 years ago and entered business with his father in this country at the age of 16. He was identified with many important sewerage, hydraulic and roadbuilding projects, and was a past president of the New England Road Builders' Association.

JOHN CRAWFORD, for 45 years a prominent contractor at Dedham, Mass., died on Feb. 18 at the age of 75.

JOSEPH COLE CONGDON, for some years superintendent of the former Pettaconsett pumping station of the Providence, R. I., waterworks, died recently in Providence. He was 82 years of age.

FRANCIS GOULD DANIELL, 64, former chief of the electrical engineer division of the New York State Transit Commission, died Feb. 12 in Flushing, N. Y. Following his graduation from Massachusetts Institute of Technology, he was associated with Thomas Edison in electrical experiment work and later did much electrical layout work on railroads in Connecticut and Ohio.

JEAN PAUL JONES, 44, civil engineer for the Hopewell Memorial Co. in Cincinnati, died Feb. 16 of a heart attack. He was at one time connected with Vickers Ammunition Co. in England and during the World War served with the British air force.

GUSTAV GULBRANDSEN, one of the Lehigh Valley's leading bridge designers, died Feb. 19 at Bethlehem, Pa., after a week's illness. He was 72 years old and a native of Norway. After coming to America in 1886 he became associated with the Pennsylvania Steel Co. in Philadelphia, later going to Bethlehem when that company was merged with the Bethlehem Steel Corp.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING construction awards total $34,960,000 for the week, a lower rate of award than heretofore reported this year. This total is composed of private construction, $8,272,000; public, $26,688,000 of which federal is $2,228,000 and state and municipal, $24,460,000. Corresponding values for a year ago are: total, $22,762,000; private, $4,763,000; public, $17,999,000; federal, $1,968,000; state and municipal, $16,031,000.

Public buildings awards at $9,882,000 are slightly higher for the week, while other classes of work are below last week. By classifications of work they total for the week: commercial buildings, $3,795,000; industrial buildings, $3,682,000; bridges, $3,306,000; streets and roads, $7,264,000; sewerage, $2,089,000; waterworks, $1,952,000; earthwork, waterways, $1,068,000.

The larger awards for the week include: sugar refinery, Spreckels Sugar Co., Woodland, Calif., $1,500,000; apartment for One South Broadway Corp., separate contracts, White Plains, N. Y., $500,000; office building, State Div. Architecture, Sacramento, Calif., $523,000; hospital and nurses' home, city and Harris County, Houston, Tex., $1,624,000; additional buildings and utilities at Veterans' Hospital, Little Rock, Ark., $901,000; highways by Georgia, $821,000; by New Jersey, $1,389,000; by Texas, $1,049,000; bridges by Texas, $431,000; end ramp and paving Bronx Approach, Contract 58, buildings and toll plaza, Contract 59, Triborough Bridge, New York, N. Y., $1,045,000; water softening plant, day labor, Minneapolis, Minn., $1,250,000; West Towns Outlet Sewer Contract 2, Chicago, Ill., $1,116,000.

State and municipal bond sales for the week include $8,790,000 in new financing and $5,740,000 transferred from federal to private investment financing through sale by RFC of PWA bonds. Outstanding PWA allotments are now going through a periodic adjustment by decreases, increases, changes from loan and grant to grant only and other minor changes.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Feb. 1935	Prev. 4 Weeks	Week Feb. 27 1936
Federal Government	$2,241	$2,915	$2,228
State and municipal	9,660	29,721	24,460
Total public	$11,901	$32,636	$26,688
Total private	5,121	12,004	8,272
Week's total	$17,022	$44,640	$34,960
Cumulative to date:			
1935...$216,353,000	1936...$453,046,000		

NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

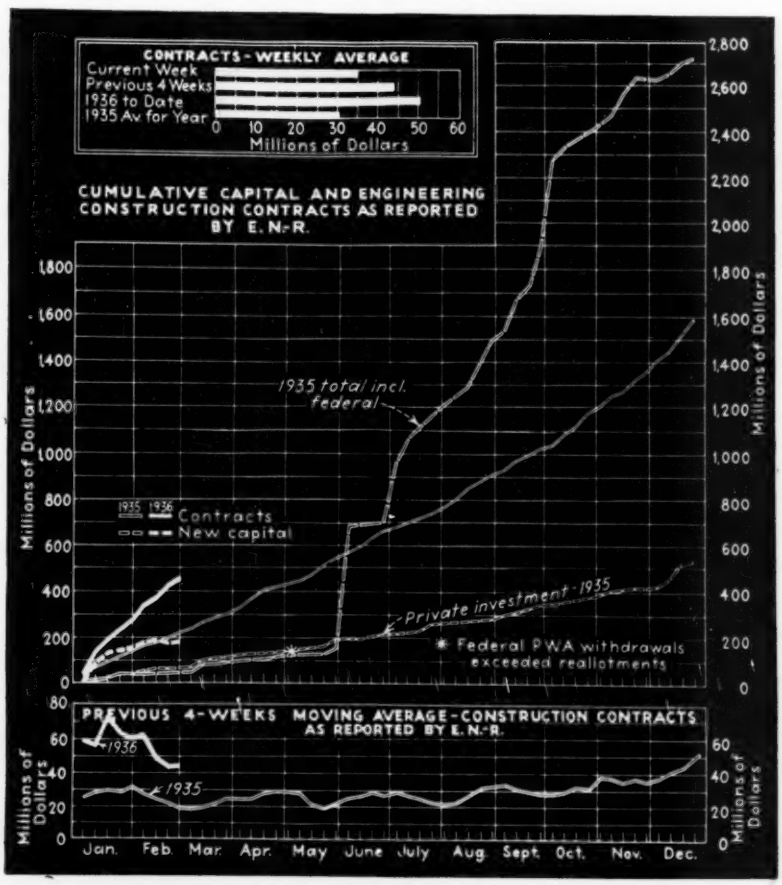
1936	Week Feb. 27	Cumulative
State and municipal	$14,530*	$87,435*
PWA non-federal	—7,986*	28,872*
RFC loans	....	25,000
Corporate issues	125	29,391
PWA loans	130	1,240
Total Non-Federal	$6,799	$171,938
Federal	351	4,271
Total new capital	$7,150	$176,209
Cumulative to date:		
1935...$39,862,000	1936...$176,209,000	

*Includes transfer from federal to private investment financing through sale by RFC of PWA bonds.

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Feb., 1936	201.20	96.71	Jan., 1936	248	100
Jan., 1936	199.48	95.89	Dec. 1935	254	111
Feb. 1935	196.02	94.22	Jan 1935	130	57
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47


CONTRACTS - WEEKLY AVERAGE
Current Week
Previous 4 Weeks
1936 to Date
1935 Av for Year
0 10 20 30 40 50 60
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E. N.-R.
Millions of Dollars
1935 total incl. federal
1935 1936 Contracts
New capital
Private investment-1935
* Federal PWA withdrawals exceeded reallotments
PREVIOUS 4-WEEKS MOVING AVERAGE-CONSTRUCTION CONTRACTS AS REPORTED BY E. N.-R.
1936
1935
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Current Construction Unit Prices

Louisville Grade Crossings

BIDS were taken Dec. 20, 1935, for the elimination of grade crossings involving approximately 1½ miles of L. & N. R.R. right of way within the city limits of Louisville, Ky. The project, under the supervision of the State Highway Commission, called for bids on track and trestle work as distinct from the grade separation structures, and composite bids on both subdivisions, with a 13 per cent saving indicated in the latter form of proposal. The following tabulation lists the unit prices, quantities, and totals of the three low bidders for the composite proposal and the totals of the lowest bidders on the separate subdivisions. Combined bids: (A) Henry Bickel Co., Louisville, Ky., $1,333,934; (B) Lowensohn Const. Co., Cleveland, O., $1,346,757; (C) Northeastern Const. Co., Winston-Salem, N. C., $1,388,823. Track and trestle work only: Arundel Corp., Baltimore, Md., $1,192,912, and on grade separation structures, Geo. M. Eady Co., Louisville, Ky., $340,323, which combined bids total $1,533,234.

	Unit Prices		
	A	B	C
Track and Trestle Work			
1. Reinforced concrete piles—99,565 lin.ft.	2.72	2.75	3.76
2. Concrete, Cl. A—24,205 cu.yd.	16.33	16.00	11.57
3. Remove concrete platform—850 sq.yd.	.23	.65	.60
4. Hardener surfacing—3,800 sq.yd.	1.06	1.00	.94
5. Crushed limestone—500 ton	1.68	2.20	2.23
6. Drains, 15 in. vitrif.—375 lin.ft.	1.32	1.20	1.88
7. Drains, 8 in. vitrif.—400 lin.ft.	.46	.45	1.20
8. Drains, 30 in. C. I. re-used—60 lin.ft.	2.72	3.20	3.50
9. Galv. steel pipe, 2 in.—25,000 lin.ft.	.82	1.00	.78
10. Joint filler, premolded ½ in.—6,000 sq.ft.	.08	.08	.07
11. Joint filler, premolded ¾ in.—25,000 sq.ft.	.105	.10	.11
12. Joint filler, premolded 1 in.—3,000 sq.ft.	.17	.20	.20
13. Copper joint strips, gutter, 24 oz.—10,000 lb.	.26	.60	.40
14. Galv. joint separators, 26 ga.—25,000 lb.	.14	.14	.16
15. C. I. drain covers—2,500, each	.46	.32	.88
16. Reinforcing steel—5,000,000 lb.	.0313	.035	.03
17. Misc. C. I. pipe, 4 to 8 in.—70 tons	111.00	100.00	106.00
18. Move station—total	1,250	1,550	1,762
19. Concrete track base—308 cu.yd.	8.40	7.50	9.63
20. Station shed superstructure—12,000 sq.ft.	1.08	2.00	1.94
21. Baggage elevator—1	5,275	7,200	8,438
22. Electric lighting, sheds, etc.—total	3,081	3,000	3,455
23. Double main track removed—6,600 lin.ft.	.30	.25	.47
24. Double main track relaid—6,600 lin.ft.	1.95	1.10	.76
25. Main track turnouts removed—21 each	40.00	32.00	30.00
26. Main track turnouts relaid—14 each	156.00	50.00	70.00
27. Steel door, elevator room—1	90.00	65.00	120.00
28. Steel sash, elevator room—3	10.00	15.00	15.00
29. Reinf. concrete face cribwall—1,800 sq.ft.	1.40	6.00	3.26
30. Automatic gates—2 pair	1,552	1,500	1,741
31. Track ballast—12,000 tons	1.75	1.60	2.11
32. Cinders & screening—2,500 tons	1.40	2.50	1.88
33. Excav. roadway, drains—19,300 cu.yd.	.50	.85	.70
34. Concrete street base, 6 in.—7,205 sq.yd.	1.50	1.90	1.47
35. Sheet asphalt binder 1½ in.—544 tons	5.20	8.00	9.40
36. Rock asphalt surface 1 in.—374 tons	12.25	12.00	14.70
37. Curb & gutter—3,527 lin.ft	.87	1.10	1.20
38. Vitrif. catch basin leads, 15 in.—380 lin.ft.	3.25	6.00	5.90
39. Catch basins—15 each	110.00	120.00	117.00
40. Catch basins removed—4 each	10.00	20.00	23.50
41. Manholes—4 each	80.00	100.00	118.00
42. Manholes, reset—3 each	5.00	5.00	6.00
43. Catch basin frames reset—8 each	5.00	5.00	6.00
44. Sewer pipe 30 in. vitrif.—333 lin.ft.	4.00	6.50	11.55
45. Stone retaining wall—160 cu.yd.	17.00	7.00	6.00
46. Lamp holes, 8 in. vit. pipe—1 each	25.00	10.00	11.00
47. Concrete sidewalk—3,898 sq.yd.	1.32	1.60	1.38
48. Concrete header—44 lin.ft.	.40	.60	.00
49. Concrete barricade wall—80 lin.ft.	5.50	4.00	4.55
50. Remove pavement, backfill—1,200 cu.yd.	1.80	1.70	1.55
51. Granite curb—80 lin.ft.	.20	1.60	1.55
52. Remove bridge—total	2,438	2,000	11,700
53. Vitrif. brick paving relaid—350 sq.yd.	1.68	1.30	2.35
54. Concrete girders, etc., cut, replace—total	300.00	210.00	600.00
Grade Separation Structures			
55. Structural steel—1,612,000 lb.	.0468	.047	.0635
56. Reinforcing steel—659,624 lb.	.031	.035	.0392
57. Concrete, Cl. A—7,131 cu.yd.	16.47	12.80	15.62
58. Footwalk concrete, Cl. A—26 cu.yd.	18.00	23.00	14.10
59. Concrete, Cl. D—1,392 cu.yd.	14.97	20.00	17.15
60. Concrete piles, 14 in.—10,800 lin.ft.	2.41	2.00	2.70
61. Concrete railing, Cl. D—62 cu.yd.	90.00	81.00	100.00
62. Concrete facia girders, Cl. D—629 cu.yd.	21.97	19.50	24.31
63. One man stone—795 cu.yd.	3.00	1.90	3.52
64. Galv. steel pipe, 2 in.—504 lin.ft.	.90	1.00	.58
65. Drains, 8 in. vitrif.—630 lin.ft.	.70	.50	1.17
66. Drains, 10 in. C. I.—156 lin.ft.	5.00	2.30	2.90
67. Drains, 8 in. C. I.—248 lin.ft.	4.50	2.00	1.76
68. Semicirc. 12 in. pipe—565 lin.ft.	1.80	2.30	2.11
69. Exp. joint filler ½ in.—1,967 sq.ft.	.105	.10	.11
70. Raise R.R. bridge—total	3,668	650.00	2,937
71. Struct. excavation—8,935 cu.yd.	3.80	2.80	3.64
72. Creosoted timber—0.734 M.B.M.	100.00	320.00	175.00
73. Waterproofing, type A—1,362 sq.yd.	.19	.23	.24
74. Waterproofing, type B—2,320 sq.yd.	3.40	3.25	3.52
75. Phos. bronze exp. plates—4,000 lb.	.29	.46	.38
76. T. C. drain pipe—200 lin.ft.	.50	.50	.35
77. Lead plates ¼ in.—44,650 lb.	.105	.10	.12
78. Lighting system, 5 bridges—total	1,886	2,600	2,115
79. Copper flashing, 24 oz.—3,935 sq.ft.	.40	.58	.40
80. Concrete handrail, Cl. D.—150 lin.ft.	6.00	7.00	7.64
81. Repair bridge No. 92—total	1,000	430.00	940.00

Colorado Highways

DECEMBER bids on Colorado state highway construction included two gravel surfacing and one railroad overhead crossing projects, for which the average and the two lowest unit prices with totals follow. Ten per cent added by the state for engineering and contingencies is included in the total figures. Crowley County—Gravel surfacing, 3 miles on state highway No. 71 between Ordway and Limon: (A) W. F. Pigg & Son, Denver, Colo. $14,473 (B) Driscoll Const. Co. Pueblo, Colo. $17,034 (C) average $21,181. Kiowa County—Gravel surfacing, 9.921 miles on state highway No. 96 between Eads and Chivington: Monaghan & Kenney, Denver, Colo. $92,000 (E) Driscoll Constr. Co. Pueblo, Colo. $95,557 (F) average $101,088. Routt County—Railroad overhead crossing, 0.568 miles on state highway No. 131 between Oak Creek and Phippsburg: (G) Lallier C.&E. Co. Denver, Colo. $45,216 (H) Edw. Selander, Greeley, Colo. $45,640 (J) average $46,843.

ROADS AND BRIDGE, COLORADO HIGHWAY SYSTEM

	Gravel Road Surfacing								Bridge			
	Crowley County				Kiowa County				Routt County			
Items	Quan.	A	B	C	Quan.	D	E	F	Quan.	G	H	J
1. Clear & grub—total	.....	10.00	50.00	137.14	.....	150.00	100.00	291.67	.....	200.00	100.00	250.00
2. Remove structures—total	.....	130.00	150.00	238.57	.....	.....	.....	.....	.....	40.00	50.00	31.25
3. Remove & reset fence—lin.ft.	31,700	.01	.01	.0128	8,100	.01	.01	.013	2,600	.04	.02	.025
4. Unclass. excavation—cu.yd.	37,500	.10	.10	.147	134,000	.14	.12	.17	29,000	.30	.34	.3475
5. Cut slope treatment—mi.	6	25.00	100.00	96.42	17	100.00	100.00	104.16	0.5	200.00	300.00	325.00
6. Dry rock excav.—cu.yd.	20	1.15	1.00	1.38	60	1.00	1.00	1.17	105	4.00	4.00	3.50
7. Dry common excav.—cu.yd.	160	.75	.50	.91	550	.75	.50	.71	320	1.00	2.00	1.625
8. Wet rock excav.—cu.yd.	5	1.25	1.50	2.11	10	1.50	2.00	2.08	15	4.00	6.00	4.50
9. Wet common excav.—cu.yd.	40	1.25	1.50	1.39	60	1.25	2.00	1.60	30	4.00	3.00	3.625
10. Sta. yd. overhaul—sta.yd.	3,000	.02	.02	.021	463,000	.02	.02	.019	36,000	.02	.02	.02
11. Gravel surfacing—ton	9,200	.40	.60	.761	33,600	.75	.53	.66	2,460	1.25	1.50	1.375
12. Concrete, Cl. A—cu.yd.	.....	.....	.....	.....	.....	.....	.....	.....	344	28.00	25.00	28.25
13. Concrete, Cl. B—cu.yd.	20	22.00	20.00	21.00	57	21.00	20.00	20.83	9	28.00	25.00	27.00
14. C.M.P. culvert, 18 in.—lin.ft.	484	1.50	1.50	1.52	.....	.....	.....	.....	386	2.00	2.00	2.00
15. C.M.P. culvert, 24 in.—lin.ft.	496	2.25	2.00	2.19	306	2.10	2.25	2.25	60	3.00	3.00	2.875
16. C.M.P. culvert, 30 in.—lin.ft.	.....	.....	.....	.....	296	2.56	2.75	2.84	.....	.....	.....	.....
17. C.M.P. culvert, 36 in.—lin.ft.	50	4.00	2.00	4.14	258	4.12	4.00	4.27	.....	.....	.....	.....
18. Untreated timber—M.B.M.	.....	.....	.....	.....	1.7	85.00	60.00	87.50	0.4	80.00	100.00	93.75
19. Treated timber—M.B.M.	.....	.....	.....	.....	40.3	110.00	120.00	108.33	.....	.....	.....	.....
20. Piling—lin.ft.	.....	.....	.....	.....	1,800	1.14	1.60	1.31	.....	.....	.....	.....
21. Barb wire fence—lin.ft.	31,300	.07	.075	.0771	77,500	.07	.075	.074	5,800	.10	.08	.09
22. Barb wire gates—each	15	5.00	5.00	5.00	15	5.00	5.00	4.50	2	5.00	10.00	6.50
23. Reinforcing steel—lb.	.....	.....	.....	.....	.....	.....	.....	.....	54,250	.06	.06	.0606
24. Structural steel—lb.	.....	.....	.....	.....	.....	.....	.....	.....	134,600	.07	.06	.0631
25. Project marker—each	1	25.00	25.00	25.71	1	20.00	25.00	24.17	2	40.00	25.00	28.75
26. R.O.W. marker—each	17	4.00	5.00	4.86	48	3.50	5.00	4.08	22	5.00	5.00	5.25
27. Sheet copper—lb.	.....	.....	.....	.....	.....	.....	.....	.....	189	.60	.50	.55

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., San Francisco—City and San Francisco Co. completing plans for four 75,000 gal. rein.-con. fire cisterns, in connection with high pressure fire system. $30,000. J. J. Casey, city engr.

Calif., Santa Cruz — Municipal Water Dpt., R. S. Tait, supt., plans constructing roof on Bay St. Reservoir. $50,000.

Conn., Bridgeport—Bridgeport Hydraulic Co., 835 Main St., plans constructing new watermains. Est. about $40,000.

Conn., Greenwich—Greenwich Water Co. making plans extending watermains, service connections, hydrants, meters, etc. $85,000. Greenwich Water Co., 253 Greenwich Ave., engrs.

Ind., Kokomo—City considering purchasing local waterworks from American Water Co. and plans improving and extending same. $30,000 or more. American Water Co. wants about $120,000 for plant, and there is some opposition from citizens as to price asked. Noted Oct., 1924, E.N.-R.

La., Kentwood—City preparing plans water reservoir. Sewerage system of town will be constructed as W.P.A. project. $5,000. J. M. Fourmy, Hammond, engr.

Mass., Andover—Town, C. Gilliard, supt. Bd. P. Wks., Town Hall, plans following c.i. watermain extension in spring of this year, 4,000 ft. Bontwell Ave., $10,300; 600 ft. Sunset Rock Rd., $1,500; 5,000 ft. Greenwood Rd., $13,375; 4,200 ft. High Plain Rd., $11,450; 1,600 ft. Brudette Ave., $4,000; 6,000 ft. Haggetts Pond Rd., $15,360; 4,100 ft. Chandler Rd., $11,275. Work to be done by Dpt. Labor upon maturity.

Mass., Greenfield—Town, A. H. Dobbrow, chn. Bd. Selectmen, Town Hall, plans ½ m.g. cement and rock reservoir near Rocky Reservoir. $20,000. Private plans by H. L. Field, supt. Water Dpt.

Mass., Harwich—Town, J. W. Crowell, chn. Bd. Selectmen, Town Hall, bids latter part of month, water system, incl. elevated water tank, pumping station and watermains. $200,000. Whitman & Howard, 89 Broad St., Boston, engrs. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

Mass., Maynard—Town, F. J. McCarron, chn. of Special Committee, Town Hall, plans addition to water supply system. $30,000. Private plans. J. Mahoney on commission. To be voted on at March town meeting.

Mich., Owosso—City plans started for completion of water softener plant. $94,000. W.P.A. project.

Mo., North Kansas City—Clay Co., Dist. 1 plans suburban water supply system. $410,000. Bonds voted. Henri-Lowrey Eng. Co., 114 West 10th St., Kansas City, engrs.

Mont., Billings—City may vote bond issue in April, furnishing, installing 1 mi. c.i. water pipe to airport, water tank, etc. $30,000. R. T. Hurdle, city engr.

N. J., Montville—Montville Twp. rejected bids constructing water supply and distribution system, Contr. 2, wells and pumping station. $170,909. Noted Feb. 13, C.D.—Feb. 20, E.N.-R.

★ **New York**—Bd. Water Supply, 346 Broadway, New York, start of work on the Delaware River water supply system for New York is provided for in the capital stock budget being considered by Bd. Estimate and Apportionment. The work now proposed is sinking and lining of shafts required for 85 mi. aqueduct tunnel estimated $20,000,000. Completion of tunnel and appurtenant structures and Rondont and Neversink reservoirs will require 6 or 7 years more.

N. Y., Altamont—Village Bd. Trustees made plans new reservoir. $16,480. L. B. Westfall, Altamont, engr.

N. Y., Amsterdam — Municipality revised P.W.A. application for loan made for filtration plant. $300,000. P.W.A. project. N. S. Hill, 112 East 19th St., New York, engr. Noted Nov. 16, 1934, C. D.—Nov. 22, 1934, E. N.-R.

N. Y., Brooklyn—New York Water Service Corp., 90 Bway., New York, plans artesian well, 1015 Franklin Ave. $30,000. A. T. Luce, c/o owner, engr.

N. Y., Goshen—Village Bd. Trustees, Village Hall, preliminary plans completed constructing waterworks. $80,000. P.W.A. project. G. H. Thompson, village engr. Noted July 30, C. D.—Aug. 1, E. N.-R.

N. Y., Marcy—See "Sewerage and Waste Disposal."

N. Y., Shackelton's Point—C. S. Brown, 725 Water St., Syracuse, made plans constructing lake water standpipe. D. J. Baum, Riverdale, archt.

N. Y., Sodus Point—Town making preliminary plans waterworks plant, Lake Rd., $31,316. P.W.A. project. L. E. Kohl, 16 State St., Rochester, engr. Noted Aug. 26, C. D.—Aug. 29, E. N.-R.

N. Y., Sonyea—Dpt. Mental Hygiene, State Office Bldg., Albany, making plans constructing water supply, at Craig Colony. $225,000. T. F. Farrell, State Office Bldg., Albany, engr.

N. Y., Warwick—State Dpt. Social Welfare, State Office Bldg., Albany, plans constructing water supply at State Training School. $25,000. T. F. Farrell, state engr.

N. C., Mervyn—Town plans waterworks system, $38,181. Approved by Washington. P. M. VanCamp, Southern Pines, engr.

O., Cincinnati—City, rejected bids installing concrete sealing weir, special castings and pipe at California waterworks plant. Will readvertise. P.W.A. project. A. G. Hibbs, supt. Waterworks.

O., New Lexington—City Council approved the location and purchase of Yauger farm for new waterworks reservoir and ordered signing of mortgage indenture, providing $55,000 through reservoir bonds.

Pa., State College — Boro plans improving plant and extending distribution lines. **Maturity indefinite.** Council voted to purchase plant and equipment of State College Water Co. for $250,000. W F. Leitzell, burgess.

Wash., Cathlamet—City, Hjalmar Johnson, Water Chn., considering drilling of well to increase town water supply.

Ont., Hanover—Town plans drilling wells at Ruhl Lake and piping water to town reservoir. $3,000. Engineer not appointed.

Ont., Kitchener—M. Pequegnat, Water Comn., supt., City Hall, plans purchasing pumping unit for Shoemaker Ave. Station, 1,200,000 gal. daily capacity, also venturi meter.

Que., Chateau Richer—Chateau Richer Waterworks Co. Ltd., has received letters of incorporation and will install waterworks system in municipality requiring all equipment.

Que., Isle Maligne—Municipality, B. A. Walton, secy., bids in March, constructing water system and sewerage disposal. $125,000.

BIDS ASKED

†**Ky., Fort Knox**—See "Unclassified."

Ill., Mount Olive—Mar. 3, by City, City Hall, constructing waterworks. $98,000. Warren & Van Praag, Inc., Decatur, engrs. P.W.A. project. Bids Sept. 4 rejected.

†**Md., Cheltenham** — Yards & Docks, Navy Dpt., Wash., D. C., taking bids constructing cased well at Naval Radio Receiving Station, Spec. 8135. (Date not set.)

Mass., Northboro—Mar. 5, by Town, Town Hall, filter equipment incl. low lift pump, altitude valve, flow controllers, 2 flow controllors, 2 flow rate gages, 2 loss of head gages, 2 chemical dry feeders, electric driven centrifugal pump and starting equipment. $10,000. P.W.A. project. Weston & Sampson, 14 Beacon St., Boston, engrs.

N. H., Manchester and Auburn — See "Contracts awarded."

N. Y., Apalachin—Mar. 3, by Owego Town Bd., Owego, constructing water system. $42,000. P.W.A. project. Bids Feb. 11 rejected. Nussbaumer & Clarke, Security Mutual Bldg., Binghamton, consult. engrs. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

N. Y., Bath—Mar. 14, by Village, 2½ m.g. standpipe, pumps, equipment, etc. $132,000. P.W.A. project. W. T. Fields, Flower Bldg., Watertown, engrs.

N. Y., Evans—Mar. 4, by Town Bd., at office E. Lemmler, clk., Angola, water supply system, for Evans Water Dist. 2. $41,474. P.W.A. project. Nussbaumer & Clarke, 327 Franklin St., Buffalo, and 158 Security Bldg., Binghamton, consult. engrs.

N. Y., Rome — Mar. 18, by Dpt. Mental Hygiene, State Office Bldg., Albany, constructing waterlines and sewers. $8,327. T. F. Farrell, state hy. engr.

Wash., Tacoma—Mar. 16, by Bd. Contrs. & Awards, new pipe line, 5/16- to 7/16-in. steel plate welded, 19,147 ft. 48 in. or alternate 2,512 ft. 48 in. 6/16 or 7/16 in. steel welded, 16,256 ft. 48 in. lock joint type concrete, 363 ft. 48 in. steel pipe and connections, part 3rd Govt. loan. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

LOW BIDDERS

★ **Que., Montreal**—City Executive received bids from Angus Robertson Ltd., offering to construct new water intake, similar to Water Boards specifications with six tubes, guaranteed to be as strong and in every way as satisfactory as pipes specified at price of $1,200,000. Tubes would be in pre-cast slabs 100 ft. long. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

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Projects $500,000 and over symbol ★
Reports noted back to former issues are designated as follows:
C. D. Construction Daily
E. N.-R. Engineering News-Record
Federal Government projects symbol †

◆

CONTRACTS AWARDED

Ark., Heber Springs—City, new water and sanitary sewerage systems to Barnett & Steed, Pine Bluff, $16,158 and $9,759 respectively. The water plant will have capacity of 300,000 g.p.d., 1 mi. north of city, and sewage disposal plant, 1 mi. east of city. **P.W.A.**

Calif., San Francisco—Dpt. P. Wks., City Hall, constructing five 75,000 gal. rein.-con. fire cisterns, one each at 22nd, 24th, 26th, 28th and 30th at Dolores Sts., to Eaton & Smith, 715 Ocean Ave., $29,075. Bids Jan. 29, awarded Feb. 11. Noted Jan. 31, C. D.

Calif., Santa Barbara—City Council, raising Sheffield Reservoir, lining same with concrete, constructing concrete retaining wall. Schedule A, 65,000 cu.yd. common and 2,000 cu.yd. rock excav., 38,000 sk.yd. grading, 40,000 cu.yd. rolled fill, 11,000 cu.yd. rock fill, 15,000 cu.yd. concrete (part), 3,000 cu.ft. gunite, 65 tons reinforcing steel (new billet or rail), 40,300 sq.yd. wire mesh, install 8½ tons hydraulic equipment, constructing gate valve house, grout old drain, 41 pairs reservoir protection wires and posts, to Kovacevich & Price, 5400 Imperial Hy., Lynwood, $139,810; Schedule B, 170 cu.yd. common excav., foundations, 30 cu.yd. backfill, 380 cu.yd. concrete footings and walls, 38½ tons reinforcing steel (new billet or rail), installing 8,300 lb. hydraulic equipment, to Case Constr. Co., 905 Westminster Ave., Alhambra, $11,388. **P.W.A.** Bids Feb. 10, awarded Feb. 17. Noted Feb. 6, C. D.—Feb. 6, E. N.-R.

Calif., Southgate — City Clerk, furnishing, erecting one 150,000 gal. steel tank, incl. concrete foundations and fence, 141 ft. tower, to Chicago Bridge & Iron Wks., 607 South Hill St., Los Angeles, $25,660. **P.W.A.** Bids Feb. 8, awarded Feb. 18. Award subject to P.W.A. approval. Noted Feb. 19, C. D.

Calif., Suisun—City Council, improving water system, incl. laying new watermains and relaying existing mains, involving cement-lined c.i. pipe with alternate bids or cement-lined steel pipe, wrapped, 3,315 lin.ft. 12 in. gravel envelope well drilled and cased, furnishing, installing automatic control switch at pump with actuating float and connecting electric circuit between aerator superstructure complete, to R. B. McNair and H. Gould, 3745 Rhoda Ave., Oakland, $34,000. Est. $35,000. **P.W.A.** Bids Jan. 31, awarded Feb. 6. Noted Feb. 14, C. D.

D. C., Wash.—District Comrs., District Bldg., filtration system, Lorton, Va., to Chicago Bridge & Iron Wks., 1700 Walnut St., Phila., Pa., $29,750. Noted Nov. 22.

Ga., Thunderbolt — City constructing pump for water works, Unit 2, to Worthington Pump & Mchy. Corp., Clinton and Roberts Sts., $5,545. Total est. $42,842. **P.W.A.** Awarded Feb. 12. Noted Jan. 22, C. D.—Jan. 30, E. N.-R.

Ga., Waynesboro—City, constructing pump for waterworks, to Dayton Dowd Co., Quincy, Ill. $5,596. Total est. $92,680. **P.W.A.** Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

Mich., Detroit—Dpt. Water Supply, furnishing labor and material for constructing retaining walls, fences and related work at Springwells Station, to Cyclone Fence Co., 237 Vinewood Ave., $10,000•••meters, water level gages and clocks, to S. B. Wiggin, 4324 Leslie Ave., $6,900. **P.W.A.** Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

†Federal Government.

For official proposal advertising see Searchlight Section

Constr. News page 133

THE BEST ½-BAG MIXER BUY—ON THE MARKET

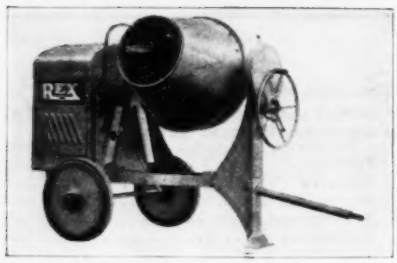

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Photo 1
Water concentrated to enlarged bleeder holes by Sika No. 4A cement plaster.

Photo 2
Two bleeder holes plugged by Sika No. 2 cement mortar. Third hole being plugged.

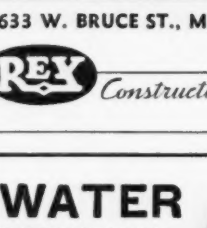

Photo 3
All bleeder holes plugged with Sika No. 2 mortar, and trimmed to contour. Ready for protective coat of Sika No. 1 cement plaster.

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to stop leakage through structurally sound masonry. Sika mixed with portland cement easily applied by hand—seals off infiltration from inside even under pressure.

Write us about your problems.

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Waterworks (Continued)

★ **Minn., Minneapolis**—City Council, water softening plant, incl. rein.-con. structure of 12 clarifiers (as 1st unit to be built now), building for storage bins for lime, recarbonization chamber, booster equipment for 2 lifts from Mississippi River to softening plant and from there to filtration plant, day labor. $1,250,000. F. T. Paul, city engr.

Neb., Loomis—City, fire hose and nozzles, Sect. 12, to A. Y. McDonald Mfg. Co., 1201 Dodge St., Omaha, $431•••tubular well and deep well pump, Sects. 8 and 9, to Layne Western Co., B.M.A. Bldg., Kansas City, Mo., $2,591 •••water meters, Sect. 6, to American Mchy. & Supply Co., 1113 Howard St., $200. Grand total $3,222. **P.W.A.** Bids Dec. 12. Noted Dec. 5, C. D.

Neb., Swanton—City, hydrants, valves and boxes, Sects. 4 and 5, to Western Supply Co., Lincoln, $928. **P.W.A.** Bids Jan. 16. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

N. H., Manchester and Auburn — City of Manchester, Bd. Water Comrs., D. F. Cronin, chn. Bd. Public Wks., laying 6,000 ft. 8 in. watermain between Manchester and Auburn, day labor. Est. $25,000.

N. J., Andover—Boro, pump and drilling well for waterworks project, to C. W. Lawman & Co., 50 Church St., New York, $3,989; pump house, to H. J. Hinds, Andover, $1,280. **P.W.A.** Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

N. Y., St. Regis Falls—St. Regis Falls Water Dist., Waverly, constructing steel water storage reservoir, to Pittsburgh-Des Moines Steel Co., 270 Bway., New York, $7,845. Bids Dec. 5. Noted Dec. 13, C. D.

O., Cincinnati—City, furnishing, constructing delivering, erecting motor driven centrifugal pumps, piping, valves and appurtenances at Western Hills Station, one 10,000,000, two 7,500,000 and one gal. daily capacity, to Dravo-Doyle Co., 302 Pennsylvania Ave., Pittsburgh, Pa., $101,000. **P.W.A.** Noted Dec. 12, C. D.—Dec. 19, E. N.-R.

Tex., Groveton — City, c/o C. C. Chesser, mayor, constructing waterworks and sanitary sewer extension, water well and equipment, to A. E. Fawcett, Port and Force Sts., Houston, $6,528; sewer extension, to Texas Automatic Sprinkler Co., 2330 Summers St., Dallas, $9,574. **P.W.A.** Bids Dec. 11. Noted Dec. 9, C.D.

Tex., Teague—City, S. W. Robinson, mayor, complete waterworks system, to Sherman Machine & Iron Wks., 18 East Main St., Oklahoma City, Okla., $50,923. Est. $55,000. **P.W.A.** Bids Dec. 2, awarded Feb. 7. Noted Nov. 2, C. D.

Wash., Bremerton—City, 5,600 ft. 4- to 12-in. c.i. pipe on Washington Ave., to give larger supply to East Bremerton, to H. G. Purcell Co., Colman Bldg., Seattle, $6,283. Awarded Feb. 18. C. H. Williams, city engr.

Wash., Morton—City, constructing headwork, 10,000 ft. 10 in. creosoted wood or steel pipe gravity main, 18,000 ft. c.i. pipe distribution system, to Hendricks & Co., 1364 Adams St., Chehalis, $37,103. Awarded Feb. 18. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

Wis., Clintonville—Water & Light Comn., constructing 60 ft. deep well, to Layne-Northwest Co., 1029 West Wells St., Milwaukee, $3,450. Bids Feb. 5. Noted Feb. 3, C.D.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Redding—City plans sewerage system in Dakin addition, involving 12,000 ft. main, $26,000. W. K. Adams, city engr.

Calif., Manteca—Surveys to be made for sewage disposal expansion and improvement of streets. To exceed $25,000. L. B. Raab, 109 East Weber Ave., Stockton, engr.

Calif., Stockton—City voted $110,000 bonds for trunk sewers. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

Conn., Derby—City making plans sewer construction and hy. work, $25,000. $50,000 bonds voted. V. B. Clarke, Capitol Bldg., Main St., Ansonia, engr.

Conn., Hartford — Metropolitan Dist. plans North Branch intercepting sewer in Park St. and Capitol Ave. from Jefferson St. intercepting sewer to Capitol Ave., picking up present South Branch interceptor, 2,545 ft. 54 in. pipe. R. N. Clark, City Hall, dist. engr.

Ill., Peoria—Greater Peoria Sanitary Dist., bids in March, 8- to 27-in. sanitary sewerage system, $200,000. Greeley & Hansen, 6 North Michigan Ave., Chicago, consult. engrs. J. R. Longley, dist. engr.

Ind., Elwood — City plans sewage disposal plant, $150,000. Moore & Frazier, Indianapolis, engrs. Noted Sept. 30, C.D.—Oct. 3, E.N.-R.

Kan., Topeka—City plans 230 acres of 8- to 18-in. vitr. clay sanitary sewers in Kansas Ave. to Burlingame Rd. and 20th St. to 27th St. and pumping station, $260,000. City Engineer, City Hall, engr.

Mich., Muskegon—City plans sewage treatment plant, $140,000; 2 lift stations, Ryerson Creek, $39,000; Rudiment Creek, $13,000.

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P.W.A. project. Consocr. Townsend & Quinlan, 205 West Wacker Dr., Chicago, Ill., engrs.

★ **Mich., Royal Oak** — Royal Oak Twp. retained Bruce Buchanans, Inc., Pontiac, as engineers on $750,000 sewer project. Immediate allocation of funds for first phase of construction is asked. W.P.A. project.

Minn., Perham—Village plans nearing completion constructing sanitary sewerage system and sewage disposal plant, $75,000. W.P.A. project. A. A. Hawkinson, Detroit Lakes, assoc. engr. R. W. Richardson, 9191 New York Bldg., St. Paul, engr.

Neb., Meddow Grove—City plans sewers, $25,000. W.P.A. project.

N. J., Nutley—Town plans 8 in. vitr. tile sanitary sewer in Joerg Ave. from High to Norman Sts., $24,384; Mt. Vernon St. from Van Winkle to East Passaic Aves., $23,054; Harrison St. parallel to East Passaic Ave., $19,892; Holly Pl., Lawton Pl. and Clement St., $17,250; Mt. Vernon St. from Bloomfield to Van Winkle Aves., $19,180; Hastings Ave. and Texas Pl., $19,976•••East Passaic Ave. from Centre to Denver Sts., $23,140. Town will furnish all materials except lumber on foregoing projects. Highland Rd. to Joerg Ave., $24,957; Windsor Pl. and Kennel Ave., $19,040; pumping station east of Bloomfield Ave. near Nutley Bell Town Line, $14,743; Milton Ave. west of Bloomfield Ave., $24,963, W.P.A. will buy all materials; Kierstead Ave., $24,528, W.P.A. furnish 8 in. pipe, Town 6 in. house connections, etc.; Hopper Ave. from Bloomfield to Van Winkle Aves., $23,042. Town & W.P.A. each supply 50% materials; Webster, Jefferson and Denver Sts. and Van Winkle Ave., $21,712, Town and W.P.A. each furnish 50% materials; Joerg Ave. from High St. to Kingsland Rd., $15,246, Town furnish all materials; San Antonio St., starting at Bloomfield Ave., running west, $23,358, Town furnishes 50% materials, W.P.A. project. Noted Aug. 19, C.D.—Aug. 22, E. N.-R.

N. Y., Bath—Village preliminary plans completed constructing sewers, $66,272. P.W.A. W. T. Fields, Flower Bldg., Watertown, engr.

N. Y., Bath—Village Bd. Trustees soon takes bids constructing sanitary and storm water sewers and treatment plant, $147,282. P.W.A. project. W. T. Field, Flower Blvd., Watertown, engr.

N. Y., Elmira—State Dpt. Correction, State Office Bldg., Albany, plans sewers and connections at Elmira Reformatory, $92,000. T. F. Farrell, Albany, state engr.

N. Y., Marcy—Dpt. Mental Hygiene, State Office Bldg., Albany, making plans sewage disposal plant, waterworks system and waterproofing buildings at Marcy State Hospital. $180,000. W. E. Haugaard, State Office Bldg., Albany, archt.

N. Y., Olean—City Council, City Hall, soon takes bids sewage disposal plant. $150,000. G. R. Miles, City Hall, engr. Noted Jan. 20, C. D.—Feb. 6, E. N.-R.

O., Cleveland—Great Lakes Exposition Co., R. G. Frisbee, Dir. Wks., Terminal Tower, completing plans sewer lines, outlet line to Lake Erie. J. P. Jones, Cary & Miller, Inc., Terminal Tower, engrs.

Okla., Vinita—City voted bonds to construct sewage disposal plant, $28,000. A. C. Moore, Joplin, Mo., engr. Noted Aug. 28, C.D.—Sept. 5, E.N.-R.

Pa., Scranton—City plans completing sanitary sewerage system in 22nd Ward, $25,000. Applied to State Dpt., Health, for permit. C. F. Schroeder, city engr.

Pa., State College—Boro plans sewage disposal plant, **Maturity indefinite.** Boro notified by Pennsylvania State College that present sewage disposal plant, owned by college and used jointly by college and boro is overloaded and boro will have to build its own plant.

Utah, Salt Lake City—Comrs. Salt Lake Co. sponsoring creation of sewer district within area between 21st and 33rd South Sts. and between 9th East St. and O. S. L. R.R. tracks. G. M. Haley, Salt Lake City, co. surv., and C. O. Pickel, P.W.A. engr., have reported favorably on project to serve 2,200 homes. P.W.A. project. Property owners will vote on bond issue. $365,000.

Wash., Vancouver—City plans 3,460 ft. 10 in. trunk sewer in alley between 38th and 39th Sts. between Washington and Harney Sts. C. C. Cartlich, City Hall, engr.

Wash., Wapato—City plans sewage disposal plant. $23,000. W.P.A. funds allotted.

Wis., Kaukanna—City making plans sewage treatment plant. Greeley & Hansen, 6 North Michigan Ave., Chicago, Ill., engrs.

Que., Isle Maligne—See "Waterworks."

BIDS ASKED

Colo., Colorado Springs — See "Contracts Awarded."

Conn., Windsor—Mar. 31, by Bd. Contr. & Supply, Metropolitan Dist., sanitary sewerage construction (Stony Brook Sewer), Wilton, Park, Plymouth, Harvey, Ludlow, Laurel Streets, Roads and Avenues, $30,000, P.W.A. project. R. N. Clark, Mgr. Sewer Div. Noted Feb. 14, C. D.—Jan. 23, E. N.-R.

Ill., Chicago—Mar. 5, by Sanitary Dist. of Chicago, 910 South Michigan Ave., constructing Upper Des Plaines Intercepting Sewer, Contr. 1 in Berwyn, Oak Park and Forest Park, Southwest Sewage Treatment Works, Div. GG, in Stickney Village and Twp. J. J. Sullivan, clk.

†*Federal Government.*

Sewerage, etc. (Continued)

Ill., East St. Louis—East Side Levee & Sanitary Dist., 628A Missouri Ave., bids about Apr. 1, constructing sanitary sewerage system, incl. 195,000 ft. trunk sewers in Lansdowne Dist., East St. Louis, Washington Park and Fairmount City. $291,637. P.W.A. project. E. F. Harper, c/o owner, ch. engr.

Ky., Providence—Mar. 12, by Mayor, Contr. 2, sewage disposal plant complete. P.W.A. project. J. S. Watkins, 606 Citizens Bank Bldg., Lexington, engr. Noted Aug. 16, C. D.—Aug. 22, E. N.-R.

Minn., Minneapolis—See "Contracts Awarded."

N. Y., Albany—Mar. 2, by City, Bd. Contr. & Supply, City Hall, reconstructing Beaver Creek Sewer. $165,000. J. J. McManus, city engr.

N. Y., Bath—Mar. 14, by Village Bd. Trustees, Municipal Bldg., constructing sewers and sewage treatment plant. $131,235. P.W.A. project. Wm. T. Field Engineers, Inc., Watertown, consult. engrs.

N. Y., Herkimer—Mar. 15, by Village Municipal Comm., Village Hall, sewage treatment plant. $60,000. P.W.A. Bids Dec. 10 rejected. H. W. Taylor, 9 Park Pl., New York, engr. Noted Jan. 21, C.D.—Jan. 23, E.N.-R.

N. Y., Olean—See "Contracts Awarded."

O., Columbus—City taking bids constructing 3,175 ft. rein.-con. block and rein.-con. storm sewer in Brookside Dr. from Main St. to James Rd., Bliss Run Dist., P.W.A. Contr. 58, Part 4. $75,000. P.W.A. project. P. W. Maetzel, City Hall, engr.

Ore., Lakeview—Mar. 6, by City Council, constructing sewage disposal plant, incl. primary settling tank with motor driven mechanism; pump house and equipment, incl. sewage pumps, sludge pump, heating plant; sludge digestion tank without mechanism, sprinkling filter with rotary mechanism; final settling tank with manually operated mechanism, sludge drying beds, chlorinator, piping.

Pa., Connellsville—City taking bids intercepting sewer extending from city limits to point below Mount Crook, into Youghiogheny River. $165,000. P.W.A. project. Morris Knowles Co., Westinghouse Bldg., Pittsburgh, Pa., engr.

Wis., Green Bay—Mar. 4, by Metropolitan Sewerage Comm. constructing sanitary sewer Contract "C" River crossing. P.W.A. project. J. Donohue Eng. Co., Sheboygan, engrs.

CONTRACTS AWARDED

Ark., Heber Springs—See "Waterworks."

Calif., Monterey Park—City Clerk, sanitary sewerage system, involving 192,496 ft. 6- to 15-in. vitr. clay pipe, to A. and B. Constr. Co., 912 Atlantic Blvd., Hynes. $235,568. P.W.A. Bids Feb. 17, awarded Feb. 19. Noted Feb. 6, C.D.

Calif., Sonora—City Council, intercepting and outfall sewers and sewage treatment plant, to Underwood Constr. Co., 6 Alvarado Rd., Berkeley. $38,827. Bids Feb. 3, awarded Feb. 8. Noted Feb. 13, C.D.—Jan. 30, E.N.-R.

Colo., Colorado Springs—E. Mosley, city mgr., sewers in various parts of city, relief labor. $25,000. W.P.A. and City approval given for material and labor. F. O. Ray, city engr.

Ga., Fairburn—City, constructing additional sewer system, to Bradfield & Slack, Decatur. $28,564. Est. $30,000. P.W.A. Noted Aug. 23, C.D.—Aug. 29, E.N.-R.

★ **Ill., Chicago**—Sanitary Dist. of Chicago, constructing West Towns Outlet Sewer, Contr. 2, in Berwyn, to McKay Eng. & Constr. Co., 228 North LaSalle St., $1,115,970. P.W.A. Bids Feb. 13. Noted Jan. 27, C. D.—Feb. 6, E. N.-R.

Ind., Greendale (Lawrenceburg P. O.)—Town Bd., A. F. Eberhardt, clk., furnishing laying 19,510 lin.ft. 8- to 12-in. vitr. and 280 ft. 6 in. c.i. pipe for sewers, to J. R. Palmer, Danville. $61,734. Est. $70,000. P.W.A. Bids Feb. 14.

Ind., Hagerstown—Town Bd., sewage disposal plant, to W. E. Mick, Inc., 1020 East Michigan Ave., Indianapolis. $27,272. P.W.A. Bids Feb. 6. Noted Jan. 31, C. D.

Minn., Minneapolis—City, furnishing, installing storm sewers, day labor. $125,000 bond issue authorized. F. T. Paul, city engr.

Minn., Minneapolis—City, constructing 5,200 ft. 7- to 8-ft. elliptical concrete lined intercepting sewer (in tunnel), Contr. 307, Div. C, Job 1200M, from 21st Ave. S. near 4th St. to Cedar-Washington Aves., thence in Washington Ave. from Cedar Ave. to 6th Ave. S., day labor, under direction of F. T. Paul, city engr. $314,960. Bids Jan. 28. Noted Feb. 11, C. D.

N. Y., Middletown—Dpt. Mental Hygiene, State Office Bldg., Albany, sewers and water lines at Middletown State Hospital, to G. A. Eveline, 16-114th St., Troy. Est. $5,002. Bids Feb. 5. Noted Jan. 22, C. D.—Jan. 30, E. N.-R.

N. Y., Niagara Falls—See "Unclassified."

N. Y., Olean—City, constructing 1,776 ft. 12 in. sanitary sewer in Riverside Dr. and 1,776 ft. 8 in. in Indiana Ave. $25,111; 15 and 18 in. sanitary sewer in Home St. $5,458; filling and grading South 4th St., $4,974, by day labor, under supervision G. Miles, city engr. Grand total $35,543. P.W.A.

O., Camden—City, constructing sewerage system, for sewer pipe and laying same, to Ostrom Realty & Constr. Co., 625 Peoples Bank Bldg., Indianapolis. $24,400; disposal plant, to C. Smith & Son, Dayton. $9,808. Est. $35,000. P.W.A. Noted Feb. 5, C. D.—Feb. 13, E. N.-R., under "Contracts Awarded."

Tex., Groveton—See "Waterworks."

BRIDGES AND GRADE CROSSINGS

Ill., Girard—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, plans constructing subway under tracks of Chicago & Northwestern R.R., ½ mi. west of here.

Ind., Anderson—City and State of Indiana plan constructing bridge over White River and Killbuck Creek as a new route for State Rd. 9, through here. Est. about $30,000. Project financed by Government and State.

Missouri—State Hy. Comn., Jefferson City, plans constructing bridge over Chicago, Great Western R.R. on Route 92, near Beverly, Platte Co., to exceed $23,000; three 50 ft. rein.-con. deck girder bridges over Chicago, Burlington & Quincy R.R., Route 92, near Beverly, Platte Co., to exceed $23,000; one 80 ft. semi-thru plate girder span steel concrete bridge over same railroad, on Route 45, south of Rushville, Buchanan Co., to exceed $23,000; five 115 ft., one 100 ft. and one 80 ft. semi-thru steel plate girder spans over same railroad and over Chicago, Rock Island & Pacific R.R., Route 59, west of St. Joseph, Buchanan Co., to exceed $23,000; one 50 ft., two 40 ft. and two 30 ft. rein.-con. bridges over Chicago & Alton R.R., Route 22, near Larrabee, Audrain Co., to exceed $23,000; one 42 ft. steel thru plate girder bridge under Chicago & Alton R.R. tracks, Route 13, at Higginsville, Lafayette Co., to exceed $23,000.

New Hampshire and Vermont—State, Hy. Dpt., F. E. Everett, comr., Patriot Bldg., Concord, N. H., and State Hy. Dpt., Montpelier, Vt., making surveys rein.-con., steel bridge over Connecticut River, at Chesterfield, N. H.

★ **New Jersey**—Public Utility Comn., Trenton, approved plans by Penn. Reading Seashore Lines for elimination overhead bridge over Berlin Cedar Brook, Winslow Twp., Camden Co.; also 2 grade crossings Bueana-Tuckahoe Rd. viaduct, and at Weymouth Rd. near Hammonton, $500,000.

New York—Dpt. P. Wks., Div. Hys., Albany, plans constructing bridges on State Hy. 627, near Beekman; and on Hy. 8327 near Millbrook. $180,000.

O., Cleveland—Bd. Comrs. Cuyahoga Co. plans repairing concrete, steel work, sidewalks, railing, resurfacing and waterproofing Detroit-Superior, Detroit-Rocky River, Broadway in Garfield Heights, Brooklyn-Brighton, Fitzwater Rd., Harvard-Denison and Mayfield Rd. Bridges, $257,000; new rein.-con. bridge on Tuxedo Rd., $125,000; new concrete, steel bridge on Rockside Rd., $35,000. J. O. McWilliams, Standard Bldg., engr.

Pa., Greenville—Erie R. R. Co., Midland Bldg., Cleveland, O., Pennsylvania R.R. Co., Broad St. Station, Phila., Comrs. Mercer Co., F. Graham, co. engr., Grove City, and State Hy. Dpt., Harrisburg, plan elimination of grade crossing on Hy. Route 238, Pymantuning Twp., south of here, comprising construction of steel, concrete hy. bridge with 34 ft. roadway over tracks of above two railroad companies. Est. $80,390. Maturity early in spring.

Pa., Scranton—City, W. A. Schunk, dir. Dpt. P. Wks., plans constructing culvert over Stafford Meadow Brook, $120,897. Maturity in spring. W.P.A. project.

Texas—State Hy. Comn., H. Hines, chn., Austin, soon takes bids I. and G. N. underpass, grading, etc., in City of Fort Worth, W.P.G.M. 847, Tarrant Co., $65,000; T. and N. O. R.R. underpass approaches and concrete pavement, Feeder Rd., Yale St., W.P.G.M. 853-A, Harris Co., $130,000; I. and G. N. R.R. underpass approaches, concrete pavement on San Pedro Ave., in and adjacent to San Antonio, Hy. 66, W.P.G.M. 829-A and W.P.G.S. 829-B, Bexar Co., $180,000; Llano River Bridge and approaches on Hy. 27 Junction, F.A.P. 133, reopened, Unit 3, Kimble Co., $300,000. New P.W.A. project.

Texas—State Hy. Comn., H. Hines, chn., Austin, plans S. A. & G. R.R. underpass and approaches, Hy. 12, W.P.G.H. 572-D, San Patricio Co.; S.P. R.R. underpass, approaches and concrete pavement, El Paso, El Paso Co., $110,000. New P.W.A. project.

Tex., San Antonio—City, C. K. Quin, mayor, soon takes bids 36 ft. wide rein.-con. bridge over San Pedro Creek, Mitchell St. $35,000. Bonds voted. J. W. Beretta Engineers, Natl. Bank of Commerce Bldg., San Antonio, engrs. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Washington—State Hy. Dpt., Olympia, made plans wooden pilings supporting approaches to present bridge over Columbia River, to be replaced with concrete piers, wooden deck to be replaced with concrete and new steel railing to replace wooden one. $160,000. L. W. Murrow, state hy. engr.

Wash., Ruston—City, election Mar. 10, $45,000 bonds, for reconstruction of span over Winnifred Ave.

Wash., Tacoma—City pledges $60,000. Pierce Co. $125,000 if federal grant of $180,000 is

(Federal Government.

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CRACKLESS CONCRETE TANKS

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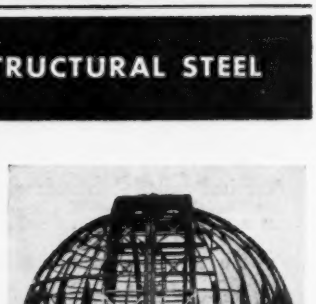

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Bridges, etc. (Continued)

secured for toll bridge over Hylebos Waterway, est. $380,000. C. D. Forsbeck, City Hall, engr. Noted Dec. 23, C. D.—Dec. 26, E. N.-R.

Wash., Vancouver—C. Deako, engr., Clark Co., Court House, in annual bridge report recommends rebuilding and repairing county bridges, $74,150.

Ontario—Middlesex Co. (London), and Elgin Co. (St. Thomas), plans rebuilding old bridge over Thames River at Middlemiss. $60,000. C. Talbot, County Bldg., London, engr. Middlesex Co. A. Bell, Court House, St. Thomas, engr. Elgin Co.

Ont., Becketts Landing — Dpt. Hys., Parliament Bldgs., Toronto, plans bridge over Rideau River at Prescott-Ottawa Hy. $150,000. Dpt'l Staff, engrs.

Ont., Belleville—City plans grade separation project to remove level crossing of Hy. 2, at west end of city. To exceed $25,000. Engineer not appointed.

Ont., Oil Springs — Lambton Co. Council making plans constructing new bridge over Black Creek. $25,000. J. C. Monteith, Petrolia, engr.

BIDS ASKED

California—See "Streets and Roads."

Colorado—See "Streets and Roads."

Conn., Bridgeport—See "Contracts Awarded."

Illinois—Mar. 3, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, constructing substructure, furnishing, fabricating, erecting structural steel, pipe handrail, rein.-con. flooring Vermilion River and Ravine Bridges, at Streator, F.A.P. 396A, Route 17, Sects. 17-B, 17-C and 17-D, Kankakee Co.; substructure and superstructure for C. & N. W. subway at Woodstock, Route 119J, Route 47, McHenry Co.; I-beam bridge C. B. & Q. R.R. overhead east of Sabbona, Project 514A, Route 71, Sect. 116VB-WPGS, DeKalb Co.; substructure and superstructure Missouri Pacific overhead in Gorham, Project 194E, Route 150, Sect. 130VC-WPGM, Jackson Co.; I-beam superstructure, rein.-con. substructure, paved approaches and rein.-con. floor rail for C. R. I. and P. R.R. overhead in Spring Valley, Project 2300, FA 94, Sect. 1VB, 1VC and 1VD, Bureau Co.; I-beam bridge, Project 544A, Route SA 9, Sect. 19B-WPSO, Jackson Co.; I-beam bridge and paved approaches east of Manteno, Project 547A, Route SA9, Kankakee Co.; 2 rein.-con. slab bridges, east of Route 2, north of Amboy, Lee Co.; rein.-con. girder substructure, I-beam superstructure and furnishing fabricating steel, north of Chatsworth, 551A, SA3, 25 B and F, Livingston Co.: rein.-con. slab bridge and rein.-con. culvert, Project 549A, Sect. 115B, Ogle and Whiteside Counties; rein.-con. substructure between Route 78 and Knox Co. line, Project 548A, SA7, Sect. 14B, Stark Co.

Indiana—Mar. 10, by State Hy. Comn., Indianapolis, constructing one 25 ft. rein.-con. arch, one 28 ft. rein.-con. girder and one 32 ft. rein.-con. girder bridges over Watt, Kifer and Graper Branches, Contr. B-1327; 75 ft. steel beam bridge on creosoted wood pilling and 220 ft. steel beam bridge on creosoted wood piling, near Lynnville, Warrick Co.; 30 ft. rein.-con. arch, 1 steel beam on creosoted wood piling and one 28 ft. rein.-con. girder bridges over Bran Branch and Pigeon Creek, Contr. B-1235; 70 ft. steel beam bridge on creosoted wood piling, Contr. B-1324; 30 ft. rein.-con. bridge over Little Boggs Creek, Burns City, Marin Co.; one 32 ft. rein.-con. and 350 ft. steel bridges over Quade Ditch and Big Sand Creek, near Reddington, Jackson Co.; 216 ft. rein.-con. girder and 202 ft. steel beam on wood piling bridges over C. S. S. & S. B. Ry. and Grand Calumet River, in Gary; 150 ft. steel, rein.-con. girder underpass Michigan Central R.R., in South Bend; 60 ft. rein.-con. girder and 36 ft. rein.-con. arch bridges over Little Birch Creek and Prairie Creek, near Beazil, Ashboro and Clay Counties. M. R. Keefe, state hy. engr.

Md., Baltimore—City, Bureau of Hys., taking bids 673 ft. rein.-con., stone faced bridge across Gwynns Falls Valley at Hilton St.

New Hampshire—Mar. 5, by State Hy. Dpt., Concord, 165 ft. through steel truss bridge and approaches over Cintocook River, Hopkinton, Merrimack Co. $60,000.

New York — Mar. 5, by Triborough Bridge Authority, 111 8th Ave., New York, paving Eastern Blvd. between Westchester Creek and Tremont Ave., Bronx Connection of Triborough Bridge, connecting Manhattan, Bronx and Queens Boros., Contr. 39.

New York—Mar. 5, by Triborough Bridge Authority, 111 8th Ave., New York, paving Grand Central Parkway extension 100 to 112th Sts., Queens Connection of Triborough Bridge, connecting Manhattan, Bronx and Queens Boros, Contr. 63.

N. Y., Tonawanda — See "Industrial Buildings."

Pa., Sharon and Farrell—Comrs. Mercer Co., Mercer, takes bids first week in March 309 ft. steel, concrete bridge on Oakland Ave. connecting Sharon and Farrell. $160,000. F. Graham, Grove City, co. engr.

Vermont—Mar. 6, by State Hy. Dpt., Montpelier, 0.6 mi. steel truss highway overpass bridge with gravel surface approaches Malletts Bay Rd., Project WPMS 185-A, Burlington and Colchester. To exceed $100,000. H. E. Sargent, State Hy. Dpt., Montpelier, ch. engr.

Wisconsin — Mar. 6, by State Hy. Comn., Madison, constructing overhead rein.-con. structure Paoli Overhead, Paoli-Oregon Rd., Dane Co., 400 cu.yd. excav.; constructing South Ninety-Second Street Overhead, W.P.G.M. 625, Milwaukee Co., 5,534 cu.yd. excav.; one 30 ft. rein.-con. deck girder bridge and grading involving 1.553 mi. Lake DeNeveu-Taycheedah Rd., Fond du Lac Co., 22,375 cu.yd. excav.; constructing two 510 ft. high truss spans for Bridge 192, Clintonville-Oconto Rd., Belle Plaine-Shawano Rd., Shawano Co.; three 30 ft. steel timber, concrete spans Bridge 120, and two 75 ft. low truss spans Bridge 119, Tomah-Necedah Rd., Monroe Co., 835 cu.yd. structural excav.; two 31 ft. steel approach spans on Whitehall-Pigeon Falls Rd., Trempealeau Co., 4,437 cu. yd. excav.; three 45 ft. I-beam structure on Hagar City-Maiden Rock Rd., Bridge 163, Pierce Co.; three 45 ft. I-beam spans Neillsville-Withee Rd., Clark Co.; two 25 ft. I-beam and timber bent span bridge on Freemont-Sand Bos-cobe, Grant Co.; superstructure for two 100 ft. truss spans, and one 100 ft. truss bridge and 8 rein.-con. culverts, Shullsburg-East Dubuque Rd., Cuba City-Shullsburg Section, Grand and Lafayette Counties, 1,565 cu.yd. structure excav.

CONTRACTS AWARDED

Alabama — State Hy. Comn., c/o G. Scott, pres., Montgomery, rein.-con. underpass and approaches on 0.177 mi. Montevallo Rd., Birmingham, W.P.G.M 387, Jefferson Co., to Harbert Cargile Constr. Co., Birmingham, $118,000••• underpass and approaches 0.187 mi. hy. under A.G.S.R.R., Attalla, WPGM 19-C, Etowah Co., to Macdougald Constr. Co., Hemphill Ave. N. W., Atlanta, Ga., $161,726. Bids Dec. 20 and Jan. 31. Noted Dec. 27, C. D., under "Streets and Roads."

Alabama—See "Streets and Roads."

Ala., Birmingham—City, c/o J. D. Webb, engr., constructing concrete double box culvert, Village Creek and Huntsville Rd., to Christie, Hutchinson & Burton, 113 North 3rd Ave., $31,174. Bids Feb. 18. Noted Feb. 10, C.D.

Arkansas—See "Streets and Roads."

Conn., Bridgeport—City, J. McLevy, mayor, replacing 3 bridges over Rooster River, at Laurel Ave., $10,255; Arcadia St., $10,161, Aldine Ave., $10,377, W.P.A. labor. Grand total $30,793. Est. $30,000. P. Brewster, dir. P. Wks. F. Toquet, City Hall, engr.

Georgia—See "Streets and Roads."

Georgia—State Hy. Dpt., Atlanta, 2 bridges on Sparta-Warrenton Rd., Warren Co., to R. H. Holz, Atlanta, $12,459•••bridge over Edwards Creek, Talbotta-Manchester Rd., Talbot Co., to A. Lyons, Rogersville, Tenn., $5,419•••bridge over Southern Ry., Columbus-Warm Springs Rd., Harris Co., to D. B. Scott & Co., Decatur, $10,876•••1 bridge on Graymont-Millen Rd., Emanuel Co., to E. H. Kemp, Ocilla, $7,525••• 2 concrete culverts at Piscola Creek, Quitman-Monticello Rd., Brooks Co., to W. F. Scott, Thomasville, $25,362. Grand total $61,041. Bids Feb. 14. Noted Feb. 21, C. D.

Ill., Decatur—See "Streets and Roads."

Ill., Freeport—Dpt. P. Wks. & Buildings, Div. Hys., constructing 3-span continuous steel I-beam bridge on Sects. 13B and C MFT, Stephenson Co., to J. J. Beard, LaMoille, $41,370. Bids Jan. 24. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

Iowa—State Hy. Comn., Ames, I-beam bridge and 3 rein.con. culverts in Greene Co., to B. Cole & Son, Ames, $14,154•••12 rein.-con. box and 6 rein.-con. pipe culverts, also 17 rein.-con. pipe and 20 rein.-con. box culverts, all in Wappello Co., to Berg Constr. Co., Van Meter, $14,941 and $20,989 respectively. Grand total $50,084. Bids Feb. 4, awarded Feb. 6. Noted Feb. 11, C. D.

Michigan — State Hy. Comn., at Escanaba, grade separation consisting of 2 rein.-con. abutments, 2 rein.-con. piers, 3 steel deck girder spans with timber floor, Iron Co., to Couse & Saunders, 415 Brainard St., Detroit, $25,958. Noted Jan. 24, C. D., under "Streets and Roads."

Michigan—State Hy. Comn., Lansing, FBI of 34-14-2, C-4, three 65 ft. spans, 2 rein.-con. abutments, 2 gravity piers, steel deck girder spans, Ionia Co., to Peninsular Constr. Co., Grand Rapids, $56,960. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

Michigan—State Hy. Comn., Lansing, 174½ ft. to have grade separation, 2 rein.-con. abutments on concrete piles, 2 rein.-con. column and girder piers, 3 half through plate girder spans with ballasted concrete deck, under Pennsylvania R.R. tracks, Wayne Co., to Walbridge-Aldinger Co., 409 Griswold St., Detroit, $140,807. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

New Hampshire—State Hy. Dpt., Concord, 37 ft. span stone-faced, rein.-con. frame bridge over railroad, Durham, Strafford Co., to Central Constr. Co., 316 Essex St., Lawrence, Mass., $75,526. Bids Feb. 6, awarded Feb. 14. Noted Feb. 14, C.D.—Jan. 30, E.N.-R.

New Jersey—State Hy. Comn., Trenton, 2 bridges to carry Route 6 across Terrace Ave. and in Lodi, Route 2, at Hasbrouck Heights, also 2 bridges to carry Route 6 over Saddle

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†*Federal Government.*

Bridges, etc. (Continued)

River and Main St., Bergen Co., to J. P. Burns, Dumont, $99,773 and $99,224 respectively••• bridge to carry Route 6 across Grandview Blvd., in Hasbrouck Heights, Bergen Co., to A. Vandemade and Tidewater Stone & Supply Co., Hackensack, $54,940. Grand total $253,937. Bids Feb. 17. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

★ **New York—Triborough Bridge Authority, 111 8th Ave., New York,** constructing end ramp and paving Bronx approach Triborough Bridge, connecting Manhattan, Bronx and Queens Boros, Contr. 58, to Tully & DiNapoli, 30-11 12th St., New York, $314,729; buildings and toll plazas, Contr. 59, to Cauldwell Wingate Co., 101 Park Ave., New York, $729,747. P.W.A. Bids Feb. 13. Noted Feb. 14, C.D.—Jan. 30, E.N.R.

New York—State Hy. Dpt., Albany, bridges in Tioga Co., to J. Tata, 858 Prospect Ave., $50,898 est. $57,313•••Monroe Co., to Dolomite Products Co., 183 Main St. E., Rochester, $63,786 est. $73,856•••Steuben Co., to A. L. Blades, Hornell, $16,450 est. $20,821. Grand total $130,834. Bids Feb. 11. Noted Feb. 17, C. D.—Jan. 30, E. N.-R., under "Streets and Roads."

N. Y., Clymer—Pennsylvania R.R. Co., W. D. Wiggins, acting ch. engr., Broad Street Station Bldg., Phila., Pa., eliminating grade crossing, to J. D. Walsh, 50 Church St., New York. Est. $79,000. Noted Feb. 7, C. D.

N. Y., Franklinville—Pennsylvania R.R. Co., W. D. Wiggins, acting ch. engr., Broad Street Sta., Phila., Pa., eliminating grade crossing at Napier Crossing, near Franklinville Station, to Rust Eng. Corp., Koppers Bldg., Pittsburgh, Pa. Est. $155,000. Bids Jan. 10. Noted Jan. 27, C. D.

Ohio—See "Streets and Roads."

O., Collinsville—Butler Co., Hamilton, constructing 2 span steel highway truss over Fourmile Creek, to H. L. Maddock Constr., Newark, $40,300. Est. $45,000. **P.W.A.** Noted Feb. 18, C. D.—Feb. 20, E. N.-R., under "Hamilton."

South Carolina—State Hy. Dpt., Columbia, 117 ft. rein.-con. bridge over S. A. L. R.R., and 0.336 mi. plain concrete approaches, W.P.G.H. 66, Sect. 1, Richland Co., to J. W. Barnwell of Columbia and Pennell & Harley, Spartanburg, joint bid, $46,571•••197.5 ft. rein.-con. bridge over S. A. L. R.R., and 0.379 mi. plain concrete approaches, W.P.G.H. 66, Sect. 2, Richland Co., to Carolina Contg. Co., Columbia, $38,178•••194.5 ft. rein.-con. bridge over Southern R.R., 0.067 mi. plain concrete approaches, W.P.G.H. 20-A, Cherokee Co., to Lee Constr. Co., Charlotte, N. C., $23,613•••120 ft. rein.-con. bridge over A. C. L. R.R. on Route 61, W.P.G.S. 404, Charleston Co., to Wannamaker & Wells, Orangeburg, $13,825•••138 ft. rein.-con. bridge over A. C. L. R.R. on Route 64, W.P.G.S. 382-D, Berkeley Co., to C. Y. Thomason, Greenwood, $16,670•••170 ft. rein.-con. bridge over S. A. L. R.R. on Route 501, W.P.G.H. 6-B, Marion Co., and 140 ft. rein.-con. bridge on Route 171, over A. C. L. R.R., at Salters, W.P.G.H. 401-B, Williamsburgh Co., to Palmer Constr. Co., Florence, $21,585 and $15,975 respectively. Grand total $176,415. Bids Feb. 4. Noted Feb. 10, C. D.—Jan. 30, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, to O. Speer, Alvord, constructing Missouri, Kansas & Texas R.R. underpass and approaches, etc., Hy. 2, W.P.G.H. 128-B, Part 1, Montague Co., $95,006 est. $100,000; F. W. and D. C. R.R. overpass, approaches and concrete pavement Hy. 5, W.P.G.M. 276-C, Wilbarger Co., $92,655 est. $100,000; I. and G. N. R.R. overpass, approaches and concrete pavement, Hy. 22, W.P.G.H. 516-F, W.P.G.M. 516-G, Hill Co., $85,295 est. $90,000•••to Uvalde Constr. Co., Santa Fe Bldg., Dallas, I. and G. N. R.R. underpass and approaches, Hy. 36, W.P.G.H. 222, Milam Co., $46,577 est. $50,000•••to J. F. Buckner, Cleburne, G. C. and Santa Fe R.R. underpass and approaches, Hy. 2-A, W.P.G.H. 330-Part 1, Johnson Co., $56,936 est. $80,000•••to Field Bros., Myrick Bldg., Lubbock, P. and S. R.R. overpass, approaches and concrete pavement Hy. 15, W.P.G.S. 815-C, Scurry Co., $54,707 est. $80,000. Grand total $431,176. New **P.W.A.** Bids Feb. 11. Noted Feb. 18, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, constructing Missouri-Pacific R.R. underpass, approaches, etc., Hy. 2, W.P.G.H. 165-B and Control No. 18-5-6, Webb Co., to H. B. Zachry, Laredo, $67,267 est. $70,000•••F. W. and D. C. R.R. underpass, concrete paving, approaches, Hy. 2, W.P.G.H. 86-A, Part 1, Montague Co., to Austin Bridge Co., 1813 Clarence St., Dallas, $70,748 est. $80,000•••M. K. and T. R.R. underpass, roadway approaches and concrete pavement on Hy. 95, W.P.G.H. 40-2, Bell Co., to J. F. Buckner, Cleburne, $67,945 est. $80,000. Grand total $205,960. New **P.W.A.** Bids Feb. 12. Noted Feb. 21, C. D.

Utah—See "Streets and Roads."

STREETS AND ROADS

BIDS ASKED

California—Mar. 5, by C. H. Purcell, engr., 808 State Bldg., Los Angeles, grading and applying road mix surface treatment, culverts, headwalls, Ventura Co., 105,300 cu.yd. earth excav., $76,500; concrete widening 4.9 mi. hy. between Oxnard to Hueneme Rd., Ventura Co., 12,500 cu.yd. excav., to exceed $23,000; grading, constructing bridge, remove existing bridges, 20.6 mi. Calipatria-Imperial Rd., New River to point 2 mi. west of Calipatria, Imperial Co., 82,950 cu.yd. earth excav. $296,800.

Colorado—Mar. 3, by State Hy. Dpt., Denver, gravel surfacing 2.695 mi. hy. between Montrose and Ouray on State Hy. 12 P.M.H293-D, Montrose Co., 75,000 cu.yd. unclassified excav.; gravel surfacing and bridge project 1.058 mi. hy. between Greeley and LaSalle on State Hy. 2, W.P.M.H. 226 E, Weld Co., 60,000 cu.yd. unclassified excav. C. D. Vail, State Office Bldg., Denver, engr.

Conn., Bridgeport—See "Contracts Awarded."

Conn., Stamford—See "Contracts Awarded."

Illinois—Mar. 3, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, concrete paving 0.64 mi. FA 377E, Route 55, Sect. 78-1, Berwyn-22nd St. from Harlem Ave. to Wesley Ave. and 1 mi. Cicero-22nd St. from 50th Ave. to Cicero Ave., Sect. 78-3, both Cook Co.; 0.25 mi. approaches to I. C. R.R. subway near Tilden, Project 96B, Route 13, Sect. 22S-WPGH, Randolph, St. Clair and Washington Counties; concrete paving 0.22 mi. approaches C. M. & St. P. & P. R.R. subway northwest of Forreston, Project 74A, Route 26, 2-S, and 0.24 mi. approaches C. M. St. P. & P. overhead east of Davis Junction, Sect. 106V, both Ogle Co.; 0.41 mi. approaches to Chicago, Burlington & Quincy overhead east of Shabbona, Project 514A, Route 71, Sect. 116C, DeKalb Co.; 3.48 mi. Gula West and South toward Wheeler, Project 413B, SA6 and 6A, Jasper Co.; 0.43 mi. approaches to Southern R.R. overhead at 26th St., East St. Louis, Project 511A, SA 32 and 52, St. Clair Co.; grading 0.15 mi. approaches to C. & N. W. R.R. at Woodstock, Project 119J, Route 47, Sect. 105A, McHenry Co.; 0.73 mi. road from southeast of Neunert, Project 544A, SA9, 10A-WPSO, Jackson Co.; 6.48 mi. road from Route 2, north of Amboy easterly, Project 389A, Route FA 141, Sect. 114A, Lee Co.; 0.28 mi. Route 108, Hagaman, Project 553, SA9-C, Macoupin Co.

Louisiana — Mar. 4, by State Hy. Comn., Baton Rouge, grading, gravel surfacing 5 mi. McGinty-East Hy., Route C 1412, Morehouse Parish; 7.263 mi. Couley-St. Maurice Hy., Route 480, Winn Parish; 1.512 mi. Hodge Intersection Route 166 Hy. on Route C 1391, Jackson Parish.

Louisiana — Mar. 4, by State Hy. Comn., Baton Rouge, concrete paving 6.012 mi. Jennings-North Hy., Route 25, 18 ft., Project 3553, Jefferson Davis Parish.

Md., Hyattsville — Mar. 9, by Mayor and Common Council, grading, curbing, guttering, sidewalks, cement concrete paving 12,850 sq.yd.; bituminous concrete surface course paving 9,750 sq.yd. streets, P.W.A. project. A. E. Pohmer Engr. Co., 20 East Lexington St., Baltimore, engrs.

Mass., Oxford—See "Contracts Awarded."

Minnesota—Mar. 6, by State Hy. Dpt., St. Paul, concrete paving 0.7 mi. State Project 60-16-27D, F.A.P. 452-B, in Butterfield; 1.1 mi. S.P. 60-16-29C, F.A.P. 452-A, in Mountain Lake; 0.3 mi. S.P. 61-3-48-1, F.A.P. 377-A, and S.P. 61-3-35-3D, F.A.P. 377-C, in Winona; 0.8 mi. S.P. 63-59-27-A, F.A.P. 4438, in Stewartville.

Mo., Farmington—City rejected bids Dec. 6, asphalt on macadam paving various roads, $37,500. Will readvertise. Noted Jan. 8, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Neb., Boone—See "Contracts Awarded."

Nevada—State Hy. Comn., Carson City, taking bids constructing 5.39 mi. Route 14, Sect. A-1, between east of Conners Pass and 5 mi. east, White Pine Co., R. A. Allen, state hy. engr.

N. Y., Brooklyn—Mar. 4, by R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, grading, asphalt on concrete paving Narrows Ave., Brighton 4th St., Cleveland, East 46th, West 3rd and West 6th Sts.; grading, curbing, Batchelder and Brown Sts.; bituminous macadam paving Emmons and Bedford Aves., also Neptune Ave. from Ocean Parkway to Brighton 3rd St.; grading, curbing flagging Neptune Ave. from Ocean Parkway to East 12th St.; asphalt on concrete paving Neptune Ave. from Brighton 3rd to East 12th Sts.

Pennsylvania—Mar. 13, by W. Van Dyke, secy. Hys., North Office Bldg., Harrisburg, bituminous on native stone or crushed aggregate surfacing 9.317 ft. Route 678, Sect. 2, Allegheny Co., incl. 48,181 cu.yd. excav.; bituminous on native stone surfacing 2,127 ft. Route 07041, Sect. 1, Blair Co., 137 cu.yd. excav.; 1,823 ft. Route 49040, Sect. 1, Northumberland Co., 2,181 borrow excav.; 5,899 ft. Route 26, Sect. 1, Snyder Co., 13,585 cu.yd. excav.; 1,150 ft. Route 90, Sect. 2, Venango Co., 1,454 cu. yd. excav.; grading, drainage 31,871 ft. Route 22026, Dauphin Co., 99,361 cu.yd. excav.; rein.-con. paving 16,033 ft. Route 59, Sect. 4, Elk Co., 23,972 cu.yd. excav.; bituminous on native stone surfacing, rein.-cor. and masonry bridge 17,834 ft. Route 45, Juniata Co., 15,855 cu.yd. excav.; bituminous on crushed aggregate and rein.-con. pavement 12,244 ft. North Ave. ext., Washington Co., 1,036 cu.yd. excav.; bituminous on modified crushed aggregate surfacing 5,077 ft. Routes 62170 and 62171, Washington Co., 5,081 lin.ft. grading, 134 cu.yd. Class 2 excav.

Pa., South Williamsport—See "Contracts Awarded."

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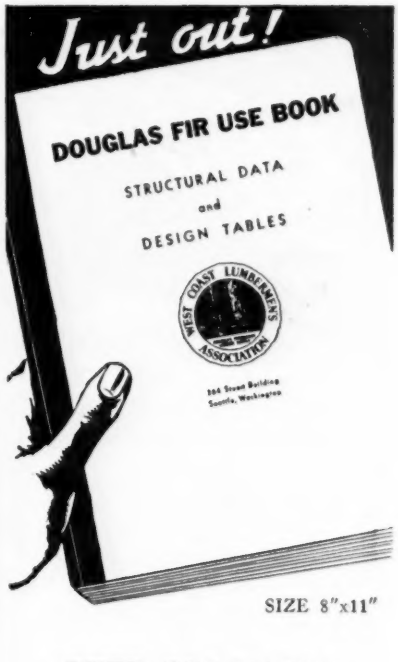
†*Federal Government.*



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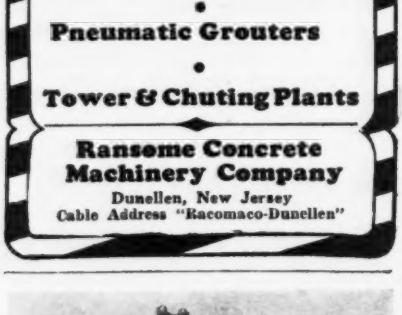

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BROWNING SHOVELS

Streets and Roads (Continued)

Tex., Coleman—City taking bids paving 9 blocks in business district. $70,000. Interested contractors communicate with owners. S. P. Scarborough, mayor.

†**Virginia**—Pub. Rds., Dpt. Agriculture, Shenandoah Life Insurance Bldg., Roanoke, withdrew bids to have been opened Feb. 27, improving 9.82 mi. Project 3B1, Albemarle, Green and Rockingham Counties. Noted Jan. 29, C.D.—Feb. 6, E.N.-R.

Wash., Seattle—Mar. 9, by Comrs. King Co., grading, drainage and crib wall graveling 0.5 mi. Puget Sound Marine View Dr. from Zenith to Salt Water Park Bridge, incl. construction of concrete bulkhead at each end of bridge, 20,391 cu.yd. excav., 7,244 sq.yd. concrete, 788 cu.yd. gravel, etc., $29,000. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

Wisconsin — Mar. 6, by State Hy. Comn., Madison, grading, draining, concrete surfacing 0.764 mi. Janesville-Stoughton-Madison Rd., Main St., Stoughton, Dane Co., incl. 11,553 cu.yd. excav.; 0.345 mi. University Ave.-Shorewood Hills Rd., Forest Products Laboratory approach, Dane Co., 8,819 cu.yd. excav.; crushed stone surfacing 9.918 mi. New Glarus-Blanchardville Rd., County Hy. H, Green Co.; 0.293 mi. Elm St., Lancaster, Grant Co., 1,314 cu.yd. excav.; grading, draining, graveling 0.255 mi. Fort Howard Ave.-City of DePere, Brown Co., 2,209 cu.yd. excav.; 6,178 mi. Johnson-Creek-Watertown River Rd., Jefferson Co., 51,345 cu. yd. excav.; 0.457 mi. Paoli Overhead approaches, Paoli-Oregon Rd., Dane Co., 30,139 cu.yd. excav.; 2.3 mi. Slinger-West Bend Rd., Slinger-West Cedar Lake Section, Washington Co., 49,534 cu.yd. excav.; grading, draining 4.216 mi. Oakfield-Fond du Lac Rd., Oakfield-U. S. Hy. 151 Section, Fond du Lac Co., 67,100 cu.yd. excav.; 1.221 mi. Clintonville-Oconto Rd., Belle Plaine-Shawano Rd., Shawano Co., 81,149 cu.yd. borrow excav.; furnishing, placing roadside treatment 1.055 mi. Kewaunee-Manitowoc Rd. (Two Rivers-Manitowoc) Rd., Manitowoc Co., 15,376 cu.yd. excav.; 1.164 mi. Jager City-Maiden Rock Rd., Pierce Co., 38,402 cu.yd. excav.; 2.72 mi. Neillsville-Withee Rd., S.T.H. 73, Clark Co., 76,161 cu.yd. excav.; 1.965 mi. Jeffries Rd., Eau Claire Co., 20,060 cu.yd. excav.; 1.193 mi. Hudson-New Richmond Rd., St. Croix Co., 14,596 cu.yd. excav.; grading, concrete paving 1.077 mi. Hudson-Menomonie Rd., St. Croix Co., 85,573 cu.yd. excav.; 2.198 mi. Weyerhauser-Potato Lake Rd., Rusk Co., 36,563 cu.yd. excav.; grading, graveling 0.189 mi. Ashland-Hayward Trego Rd., Springbrook Stinnet Rd., Washburn Co., 25,675 cu.yd. excav.; 3.272 mi. Superior-Black River Falls Rd., S.T.H. 35, Douglas Co., 91,549 cu.yd. excav.; grading, draining mine tailings 0.481 mi. Mineral and Water St., Platteville, Grant Co., 4,931 cu.yd. excav.; grading 6.978 mi. Shullsburg-East Dubuque Rd., Cuba City-Shullsburg Section, Grand and Lafayette Counties, 194,834 cu.yd. excav.

Ont., Ottawa — Secretary Bd. Control soon takes bids repavement of track allowance on certain streets of the Ottawa Electric Ry. Co., $225,000. F. C. Askwith, City Hall, engr.

CONTRACTS AWARDED

Alabama — State Hy. Comn., c/o G. Scott, pres., Montgomery, asphalt on concrete widening, concrete paving 0.198 mi. Montgomery city streets, NM 216- and Ext., and asphalt paving 0.11 mi. Montgomery city streets, NRM 336-A, to Hodgson Constr. Co., Inc., North Perry St., Montgomery, $10,693, and $5,583 respectively, both in Montgomery Co.***double bituminous surface treating 2.354 mi. Alex. City-Jackson Gap Rd., W.P.H. 78, ADE and Ext., Tallapoosa Co., to W. C. Shepherd, 347 Elizabeth St., N. E., Atlanta, Ga., $98,277***underpass and approaches under Central of Georgia R.R., on 0.439 mi. hy. in Vincent, WPGM 388-A, to Beckham & Lawler, Perry, Ga., $78,963*** grading, draining, graveling, rein.-con. bridge on 0.241 mi. hy. in Vincent, WPMS 388 B, to Geo. A. Thomason, Greenwood, S. C., $15,962, both in Shelby Co. Grand total $209,478. Bids Jan. 18 and 31. Noted Feb. 10, C. D.

Arizona—State Hy. Comn., Phoenix, improving Phoenix-Prescott Hy., to Daley Corp., 4430 Boundary St., San Diego, Calif.***Ash Fork-Kingman Hy., to G. W. Orr, El Paso, Tex.*** Phoenix-Yuma Hy., to Heuser & Garnett, 816 Allen Ave., Glendale, Calif. Bids Jan. 24. Noted Jan. 13, C. D.—Jan. 16, E. N.-R.

Arkansas — State Hy. Dpt., Little Rock, grading, drainage, service graveling 2.1 mi. Vincent Ebony Rd. Hy. 64, Crittenden Co. and concrete paving 7 mi. Gould-Dumas Hy. 65, Desha Co., to D. B. Hill, 115 North Spring St., Little Rock, $20,472 and $86,399 respectively, est. $40,000 and $100,000 respectively*** grading, service graveling 4.4 mi. Mills Bayou N. E. to Indiana Spur, Arkansas Co., to McGeorge Constr. Co., Pine Bluff, $31,926, est. $40,000***grading, 3 timber bridges on 8 mi. Mannstown South to Johnsville, Bradley Co., to A. D. Brown, Texarkana, Tex., $27,656, est. $40,000***grading, bituminous surfacing 4.5 mi. West Yellville East on Hy. 62, Missouri Co., to Roy Tanner Paving Co., Tulsa, $57,099, est. $60,000***2 bridges on Hy. 65, Desha Co., to Dixon & Dixon, Warren, $21,653, est. $40,000. Bids Feb. 14. Received no bids Feb. 14, improving 8.3 mi. Sebastian-Hackett Rd., Hy. 10, Sebastian Co., $80,000 and 6.1 mi. Hy. 270, Sect. 5, Hot Springs, West Rd., Garland Co., $60,000. Grand total $245,205. Noted Feb. 7, C. D.

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California—C. H. Purcell, engr. State Hy. Lab., 808 State Bldg., Los Angeles, widening, asphaltic concrete paving 3.7 mi. hy. between T[illegible] Circle and Los Angeles St., Los Angeles Co. to Sully-Miller Contg. Co., 1500 West 7th St., Los Angeles, $38,568; grading, asphaltic concrete paving 0.6 mi. hy. through Sunland between Fenwick St. and Scoville Ave., to Southwest Paving Co., 11,402 Radford Ave., Roscoe, [illegible] 812. Bids Jan. 30, awarded Feb. 12. Noted Jan. 31, C. D.

Conn., Bridgeport—City, constructing 15 mi. new concrete sidewalks, concrete curbs, [illegible] parts of city, repairing sidewalks in 10 districts, **W.P.A.** labor, P. Brewster, dir. P. W. $400,270. Federal **W.P.A.** contributes $279,237, city $121,033; bituminous macadam surfacing 1,500 ft. Park St., $34,077; 500 ft. new road Seaside Park Dr. and 600 ft. new road Iranistan Ave., $22,848, **W.P.A.** labor, P. Brewster, in charge.

Conn., Stamford—City, constructing 1,000 ft. curbing, 500 ft. retaining wall, lowering grade and resurfacing Stillwater Ave., **W.P.A.** labor, $23,006. J. C. Williams, City Hall, engr.

Conn., Stamford—City, bituminous macadam paving Midland Ave. incl. retaining wall, curbs and gutters, concrete construction. Owner builds, W.P.A., labor, $26,644. Awarded Feb. 17, J. C. Williams, City Hall, engr.

★ **Georgia**—State Hy. & P. Wks., Atlanta, to E. A. Hudson's Sons, Bolton, paving 3.004 mi. Winder-Gainesville Rd., Barrow and Jackson Counties, $41,813***to Hardaway Contg. Co., Georgia Home Bldg., Columbus, 10.534 mi. La Grange-Franklin Rd., Troup Co., $[illegible] 369***to M. J. Carroll, Inc., Ocala, Fla., 3.812 mi. Newman-Griffin Rd., Coweta Co., $66,067; 6.6-mi. Metter-Statesboro Rd., Bullock Co., $46,725***to Cornell-Young Co., Macon, 11.04 mi. Hawkinsville-Montezuma Rd., Houston Co., $120,698***to Espy Paving & Constr. Co., Savannah, 6.034 mi. Buena Vista-Ellaville Rd., Schley Co., $67,179***to W. L. Cobb Constr. Co., Atlanta, 7.329 mi. Sylvester-Cordele Rd., Worth and Crisp Counties, $49,816***to A. Lyons, Rogersville, Tenn., 0.658 mi. Monticello-Jackson Rd., Jasper Co., $23,080; constructing guard rail 10,356 lin.ft. hys. in Paulding, Chattooga, Haralson, Floyd and Cherokee Counties, $7,036; 8,634 lin.ft. hys. Walton, Clarke, Jasper and Madison Counties, $5,866; constructing 5,565 lin.ft. guard rail hys. in Thomas, Miller, Early, Stewart, Decatur and Bleckley Counties, $3,804***to D. B. Scott & Co., Decatur, constructing 3,058 lin.ft. guard rail, Elberton-Washington Rd., Wilkes Co., $2,141***to S. E. Finley, 292 North Ave. N.W., Atlanta, 10,297 lin.ft. guard rail on hys. in Johnson, Emanuel, Hancock and Wilkinson Counties, $5,818; 7,530 lin.ft. hys. in Warren, Mitchell, Bleckley, Early, Fulton and Coffee Counties, $3,975***to Gibson & Robinson, Donaldsonville, paving 0.275 mi. Calhoun Co., $15,103; grading, 1 bridge, 7,387 mi. Jesup-Brunswick Rd., Wayne Co., $43,735***to M. R. Woodall Co., Inc., 1594 Lakewood Ave. S.E., Atlanta, grading 8.473 mi. Sparta-Warrenton Rd., Warren Co., $47,597***to Hooper Constr. Co., Bunnell, Fla., grading 1 bridge 8,098 mi. Jesup-Brunswick Rd., Wayne and Glynn Counties, $89,289***to W. J. Tidwell, Jr., Douglasville, grading, 2 overhead bridges 0.353 mi. Dallas-Villa Rica Rd., Paulding Co., $29,105***to Harrison-Wright Co., Inc., 16 West 3rd St., Charlotte, N. C., grade crossing, warning signals Virginia Ave., College Park, Fulton Co., $7,430. Grand total $820,546. Bids Feb. 14. Noted Feb. 21, C. D.

Ill., Decatur—City, grading, culverts, guard rail, 8.2575 mi. Sect. 302MFT and 2.2819 mi. Sect. 451X-MFT, to Birt Bros. Constr. Co., Decatur, $38,033 and $14,630 respectively*** two 30 ft. I-beam bridges on creosoted piling Sect. 303B and 4 track through girder bridge with retaining walls and pump house, Sect. 7BCS, to C. R. Miller & Sons, Inc., Decatur, $4,767 and $60,848 respectively***traffic bound surfacing 8.2575 mi. Sect. 302-MFT, to G. A. Hackett, Decatur, $28,333***sewering, curbing, concrete paving 0.1208 mi. Sect. 7CS, to File & Collins, Decatur, $21,524***lighting material for proposed Conduit Street Subway, to Morehouse & Wells, Decatur, $414 and to Fields & Shorb, Decatur, $514. Grand total $169,063. Bids Dec. 2 and Feb. 2. Noted Jan. 2, C. D.

Ill., Peoria—Dpt. P. Wks. & Buildings, Div. Hys., paving 1.1084 mi. Sect. 3-CS and 0.8932 mi. Sect. 4-CS, to Jeffries & Buchholz, Peoria, $71,301 and $58,911 respectively. Bids Dec. 10. Noted Nov. 29, C. D.—Dec. 5, E. N.-R.

Iowa—State Hy. Comn., Ames, grading 0.321 mi. Greene Co., to Specketer Constr. Co., Sioux City, $14,049***clearing, grubbing, grading 3.856 mi. and 9.374 mi. Wapello Co., to Longervone Constr. Co., Des Moines, $25,936 and $53,324 respectively. Grand total $93,309. Bids Feb. 4. Noted Feb. 11, C. D.—Jan. 30, E. N.-R.

Kansas—State Hy. Comn., at office of County Clerk, Troy (**P. means Project**), to C. J. McCoy, Emporia, earthwork, culverts, concrete paving 0.108 mi. P. 36-26-WPMH 319-G, $15,855; 0.997 mi. P. 36-26FA 319-G, $73,729***to Blue Rapids Gravel Co., Blue Rapids, light type surfacing 6.1 mi. P. 77-26-FA 409-D, $4,039, all foregoing in Marshall Co.; resurfacing 0.9 mi. P. 24-2A-6703, $154; 11.7 mi. P. 13-17-6704, $718; 0.5 mi. P. 13-16B-6705, $86, all foregoing in Pottawatomie Co.; resurfacing 3.4 mi. P. 9-20-6699, $337; 1.8 mi. P. 9-22A-6700, $178; 9.3 mi. P. 13-18B-6701,$347, all foregoing in Marshall Co.; 6.2 mi. P. 13-16A-6706, Pottawatomie Co., $684***to Dan Scherrer Constr.

†*Federal Government*

Streets and Roads (Continued)

Co., 645 Minn. St., Kansas City, 13.8 mi. P. 63-1-6702, Pottawatomie Co., $1,960***to Cook & Cone, Ottawa, 12.1 mi. P. 73-35-6698, Brown Co., $4,120***to Brosnahan Bros., City Bank Bldg., Kansas City, Mo., concrete paving 3.504 mi. P. 36-35-FA 169-CD, Doniphan Co., $93,-375. Grand total $195,580. Bids Feb. 15. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, concrete paving 0.455 mi. Mansfield-East Hy., Route 9, Project 2551-B, PWH, Project NRM 189-C, De Soto Parish, to Forcum-James Co., Dyersburg, Tenn., $16,174***grading, gravel surfacing 5 mi. Mt. Pleasant-Wardville Hy., Route C-1431, Project 1137, Morehouse Parish, to C. E. and R. A. Carpenter, Bastrop, $23,718 ***4 mi. Joes Bayou-Intersection Route 45, Hy. on Route 1285, Project 863-B, East Carroll Parish, to Louisiana Materials Co., 1510 Julia St., New Orleans, $20,128. Grand total $60,-020. Bids Feb. 5. Noted Feb. 16, C. D.—Jan. 16, 23 and 30, E. N.-R.

†**Louisiana**—U. S. Eng., 605 Union Bldg., New Orleans, constructing 11,000 lin.ft. shell road and 2 timber trestles, 1,100 lin.ft. long, to G. Thorguson & T. Mack, Berwick, $24,702. Bids Feb. 5. Noted Jan. 29, C. D.

Mass., Oxford — Town, gravel roads, relief labor under W.P.A. $28,000. Owner purchases materials, $3,000.

Michigan—State Hy. Comn., Lansing, grading, drainage structures, concrete surfacing 2.121 mi. WPGH-7-11C-7, Baraga Co., to Delta Contg. Co., Escanaba, $81,144. Noted Jan. 24, C. D.

Michigan—State Hy. Comn., Lansing, grading, drainage structures, concrete surfacing 2.827 mi. F23-26C-2, Eaton Co., to McKenzie Co., Dearborn, $72,206***5.319 mi. F23-26C-1, Eaton Co., to Grace Constr. & Supply Co., Marshall, $133,057***6.237 mi. WPH SO-53-22C-1, Mason Co., to Lewis-Frisinger Co., Ann Arbor, $107,853***grading, shaping, drainage structures, concrete paving 4.428 mi. F18-16C-6, Clare Co., to T. McNally, Saginaw, $99,637. Grand total $412,753. Noted Feb. 19, C. D.—Feb. 27, E. N.-R.

Michigan — State Hy. Comn., Escanaba, grading, drainage structures, 2.676 mi. F-21-29C-6, Delta Co., and grading, drainage structures, 2 course gravel surfacing 3.447 mi. FH-2-24C-2, Alger and Schoolcraft Counties, to C. M. Loomis, Grand Rapids, $45,865 and $29,003 respectively. Bids Feb. 7. Noted Feb. 3, C. D.

Michigan—State Hy. Comn., Lansing, shaping, concrete paving 3.208 mi. F41-35C-8, Kent Co., to H. C. Nelson, Muskegon, $75,620 ***1.723 mi. F28-27C-2, Grand Traverse Co., to L. W. Edison, Grand Rapids, $41,475*** grading, shaping, drainage, concrete paving 1.533 mi. F-13-27C-6, Calhoun Co., to E. J. Vanderveen, Grand Rapids, $46,239. Grand total $163,334. Noted Feb. 14, C. D.

Michigan—State Hy. Comn., Lansing, grading road, drainage, oil aggregate surfacing 2.647 mi. WPMS 63-53C-1, Oakland Co., to Ann Arbor Constr. Co., Ann Arbor, $62,941; grading, drainage structures, 2.670 mi., Wexford Co., to L. Garavaglia Co., 4514 Burns St., Detroit, $32,049. Noted Feb. 6, C. D.—Feb. 13, E. N.-R.

Minnesota—State Hy. Dpt., St. Paul, grading 4.3 mi. State Project 4-4-55-2, between points 3 mi. southeast of Greenwald and 1 mi. south of Spring Hill, incl. 106,238 cu.yd. excav., to Megarry Bros., Bain, $24,536. Bids Jan. 17. Noted Jan. 6 and 10, C. D.—Jan. 9, E. N.-R.

Neb., Boone — City, graveling farm roads, relief labor. $31,000. W.P.A. allotment approved.

New Jersey—State Hy. Dpt., Trenton, grading, paving 2 mi. Route 25, Sects. 2A and 3A, between Crystal Lake and Bordentown, to P. Camillo & Co., Inc., 335 Spring St., Westfield, $211,750. Bids Feb. 3. Noted Feb. 6, C. D.—Feb. 13, E. N.-R.

★ **New Jersey**—State Hy. Dpt., Trenton, paving 4.379 mi. Route 6 Sec. 7 from Clifton to Hasbrouck Heights, Passaic and Bergen Counties, to G. M. Brewster, Bogota, $1,388,-549. Contractor awarded 700 tons reinforcing steel, to Truscon Steel Co., 1315 Albert St., Youngstown, O. Awarded January. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

New York—State Hy. Dpt., Albany, improving 1.37 mi. road in Chenango Co., to J. F. Paddelford, Sherburne, $128,378. Est. $181,967. Bids Feb. 11. Noted Feb. 17, C. D.—Jan. 30, E. N.-R.

N. Y., Fredonia—Town Bd., Pomfret, grading, ditching, draining, graveling Chautauqua, Lily Dale, Harmon Hill, and Webster Rds., day labor, under Twp. Hy. Superintendent, Fredonia, $23,259; Village of Lakewood will place street and traffic signs, removing and repairing obsolete signs and painting all water hydrants, day labor, under supervision village engr. $2,644, **W.P.A.**

Ohio—J. J. Jaster Jr., Hy. Director, Columbus, grading, drainage structures, roadside improvement, concrete paving 4.444 mi. Lima Delphos Rd., State Hy. 127, U. S. Route 30 S, Allen Co., Proposal 1, 0.441 mi. same road, Proposal 3, and constructing concrete beam bridge over Honey Run, Marion Twp., and concrete bridge with steel girders over Ottawa River, American Twp. on same road, Proposal 2, also grading, drainage structures, concrete paving, 6.863 mi. Delaware London Rd., State Hy. 241, U. S. Route 42, Madison Co., Proposal 1, and constructing, concrete slab bridge 0.01 mi. same road, Proposal 2, to L. L. Clymer, Bluffton, $209,145 and $178,684 respectively; roadside improvement 3.109 mi. State Hy. 71, Akron-Massillon Rd. and Sect. A, Cleveland-Massillon Rd., State Hy. 17, Route 21, Stark Co., to L. Lucrarelli, 1455 Washington Blvd., Mayfield Heights, $7,699. Grand total $395,528. Received one bid Feb. 18, which was not opened roadside improvement 1.33 mi. Cleveland Buffalo Rd., State Hy. 2, U. S. Route 20, Ashtabula Co., will readvertise. Noted Feb. 5, C. D.—Feb. 13, E. N.-R.

Pa., South Williamsport—Boro, removing approximately 1 mi. trolley tracks in Market St., Southern Ave. and Riverside Dr. and replacing with crushed stone base and 2 in. topping of amesite, day labor, under supervision of A. J. Whitney, Jr. $29,874. **W.P.A.** project.

South Carolina—State Hy. Dpt., Columbia, earth type surfacing 3.415 mi. Route 261, W.P.S.S. 434, Williamsburg Co., to R. Lee, Summerville, $36,932***5.277 mi. Route 33, W.P.H. 40, Sect. 2, Allendale Co., to J. F. Cleckley, Cope, $37,339***5.69 mi. Route 341, W.P.M.S. 425 and W.P.S.S. 425, Lee Co., to R. B. Tyler, 1440 Levering St., Louisville, Ky., $36,341***earth type surfacing 5.744 mi. Route 38, W.P.H. 355-C, Marlboro Co., to Hubbard Constr. Co., Maron, $45,954***bituminous surfacing 0.502 mi. U. S. Route 501, approaches to bridge over S. A. L. R.R., at Rains, W.P.G.H. 6-B, and State Project 6-B, reopened, Marion Co., to E. W. Grannis, Fayetteville, N. C., $21,-242***0.4 mi. earth type surfacing Route 64, W.P.G.S. 382-D, Berkeley Co., and 0.545 mi. Route 171, Route W.P.G.H. 401B, Williamsburg Co., to W. F. Florence Constr. Co., Powder Springs, Ga., $20,823 and $30,884 respectively ***bituminous surfacing 3.541 mi. hy. and constructing 76 ft. treated timber, concrete, steel bridge over Lake Swamp on Route 763, W.P.S.S. 371-C, Darlington Co., to Hardaway Contg. Co., 15 11th St., Columbus, Ga., $48,708. Grand total $278,223. Bids Feb. 4. Noted Feb. 10, C. D.—Jan. 30, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, bituminous on crusher run broken stone surface treating 7.552 mi. State Hy. 2, Control 16-3-3 and 16-4-9, Hays and Comal Counties, to Cage Bros. and J. C. Ruby, Bishop, $55,911 est. $70,000; concrete paving 10 mi. State Hy. 172, Control 420-1-3, Jackson Co., to Froeming Kies, Inc., Corpus Christi, $191,712 est. $200,000. Bids Feb. 11. Noted Feb. 18, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, roadside improvement, grading, planting 0.522 mi. State Hy. 32, W.P.H. 562, Navarro Co., to E. W. Hable, Corsicana, $10,257 est. $10,000*** roadside improvement 15.557 mi. State Hy. 15, W.P.H. 363, A, B and C, Van Zandt Co., to A. L. Cook, Ottawa, Kan., $16,383, est. $20,000 ***7.908 mi. State Hy. 94, W.P.S.S. 776-G, Angelina Co., and 10.078 mi. State Hy. 26, W.P.H. 642-A, Gregg Co., to A. Lyman Eagan, Dallas $12,956 and $13,296 respectively, est. $12,000 and $15,000 respectively***grading, drainage structures, asphalt surface treating 4,-879 mi. State Hy. "F" W.P.S.O. 893-A, Wood Co., to A. L. Mays, Jasper, $24,249 est. $20,000*** grading, sledged stone base course with asphalt base preservative 2.061 mi. State Hy. 108, W.P.S.S. 812, Palo Pinto Co., to Crouch & Noland, Strawn, $28,682 est. $35,000***caliche base course surfacing 8.599 mi. State Hy. 4, W.P.M.S. 818-B, Webb Co., to Morgan Constr. Co., 1701 Tower Petroleum Bldg., Dallas, $63,-905 est. $80,000***grading, small drainage structures, asphaltic surface treating 5.624 mi. State Hy. 27, W.P.M.H. 440-F, Bexar Co., to Colglazier & Hoff, Seguin Rd., San Antonio, $86,203 est. $80,000***grading, drainage structures 0.56 mi. State Hy. 2, W.P.M.H. 181, Part 2, Johnson Co., to J. F. Buckner, Cleburne, $40,-990 est. $40,000***6.829 mi. State Hy. 105, W.P.G.S. 760-B, Grimes Co., to P. B. Keller, 2424 Myrtle St., Dallas, $74,134 est. $80,000, Grand total $371,055. Bids Feb. 12. New **P.W.A.** G. Gilchrist, state hy engr., Austin, Feb. 12, widening, grading, drainage structures 12.014 mi. State Hy. 15, W.P.M.H. 526-C and D, from Ben Sira & Co., 3101 5th Elm St., Dallas, $249,952 est. $250,000. G. Gilchrist, state hy. engr., Austin, rejected bids Feb. 12, grading, drainage structures 4.797 mi. State Hy. "F," W.P.S.O. 903-A, Lavaca Co., will be readvertised. Noted Feb. 10, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, widening existing sledge stone base and bituminous surfacing 3.891 mi. State Hy. 6, W.P.H. 113, Hill Co., to Central Bitulithic Co., P. O. Box 5343, Dallas, $68,173 est. $80,000*** grading, drainage structures, road oil and asphalt treating 5 mi. State Hy. "F", W.P.S.O. 890 A, Henderson Co., to Briggs-Spence Co., 3553 Rankin St., Dallas, $30,846 est. $30,000 ***widening roadway and drainage structures 6.386 mi. State Hy. 1, W.P.M.H. 439-B, Part 3, El Paso Co., to West Texas Constr. Co., 501 East Rosedale St., Fort Worth, $96,208 est. $90,000***grading, drainage structures 6.883 mi. State Hy. 5, P.W.M.H. 311-C, and W.P.H. 311-D, Red River Co., to C. A. Constant and Earl Yates & Son, 5750 Marquita St., Dallas, $100,460 est. $100,000***roadside improvement, grading, planting 2.535 mi. State Hys. 7 and 67, W.P.M.H. 593 A and B, and W.P.M.H.

†*Federal Government.*

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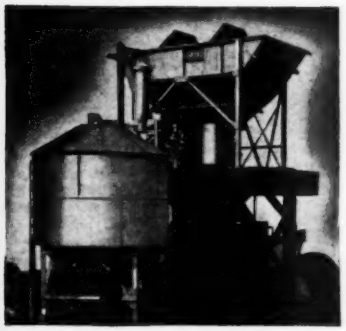
BLAW-KNOX

Construction Equipment



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Streets and Roads (Continued)

601-B, McLennan Co., to N. G. Crews, Waco, $11,345 est. $20,000•••caliche and limestone base course paving 15.72 mi. State Hy. 5, F.A.P. 523-C, Carson and Armstrong Counties, to Cocke & Braden, Amarillo, $116,528 est. $140,000, all foregoing New P.W.A.•••furnishing, installing steel jetties for protection of south bank of Prairie Dog Town fork of Red River adjacent to and upstream from bridge on Hy. 5, Job M 25-9, Hall Co., to Kellner Jetties Corp., 415 East Gordon St., Topeka, Kan., $5,992 est, $8,000. Grand total $429,552. Bids Feb. 11. G. Gilchrist, state hy. engr., Austin, rejected bids Feb. 11, roadside improvement 0.283 mi. Hy. 29, W.P.H. 183-Caldwell Co., will readvertise. Noted Feb. 18, C. D.

Utah—State Rd. Comn., Salt Lake City, graveling 10.341 mi. state road between Nephi and Levan, Juab Co., to J. W. Whiting, Springville, $110,499 est, $134,392; constructing 50 ft. concrete bridge in Piute Co., to W. W. Clyde & Co., Springville, $13,204 est, $14,137. Bids Feb. 14. Noted Feb. 6, C. D.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

Calif., Los Angeles—Harbor Dpt., City Hall, A. Eldridge, genl. mgr., made application for War Dept. permit to dredge an area in the West Basin, Los Angeles Harbor width varying from 1,000 ft. to 350 ft., all to depth of 35 ft., dredge slips 230 and 232 to depth of 40 ft., total 836,700 cu.yd. dredged material to be deposited in adjacent area. $230,000. P.W.A. project.

★**Calif., Redondo Beach**—City Council and local civic bodies are seeking county and federal aid to secure construction of harbor facilities to enclose an anchorage of approximately 55 acres by means of a steel bulkhead, $1,250,000. A bond election for this work failed to carry last November. Koebig & Koebig, Rowan Bldg., Los Angeles, engrs.

★**Calif., Santa Ana**—Superv. Orange Co., Court House, have decided to file another application with the Government for aid in financing the proposed county-wide flood control and water conservation program. This is to be done in order to keep alive the W.P.A. allotment of $6,574,000 that had been granted with the hope that some means may be found in the near future to finance the county's necessary contribution to the cost of the project. Est. $13,000,000. M. N. Thompson, Court House Annex, engr. Noted Jan. 3, C.D.—Jan. 9, E.N.-R.

Mass., Chatham — Town and Commonwealth of Massachusetts, W. F. Callahan, comr., 100 Nashua St., Boston, plans dredging in anchorage basin, north of Chatham Bars. $25,000.

Mass., Falmouth—Town, A. Underwood, chn. Bd. Selectmen, Town Hall, plans dredging and stone jetty at westerly entrance of Waquoit Harbor, $10,000; stone breakwater in Megansett Harbor on west side of wharf, $12,000.

†**New Jersey**—U. S. Eng., 39 Whitehall St., New York, made plans dredging and maintenance 15 ft. channel from deep water opposite Keasbey to mouth of Washington Canal, at Sayreville. $30,000.

†**New York**—U. S. Eng., Wash., D. C., made plans removing shoals, repairing dikes between New York and Waterford in Hudson River. $200,000.

New York—Dpt. P. Wks., Div. Hys., Albany, plans retaining walls in Putnam Co. $40,000. J. F. Bixby, Pleasant Valley Rd., Poughkeepsie, engr.

†**New York**—U. S. Eng., 39 Whitehall St., New York, plans dredging to full project dimensions Bay Ridge and Red Hook Channels.

North Carolina—Swift Creek Drainage Comn., c/o F. M. Wooten, Greenville, plans constructing 27 mi. canal to drain Swift Creek, covering 60,000 acres, involving 1,219,067 cu.yd. earth to be excavated, in Pitt Co. $154,000.

Pa., Hanover—Boro plans changing course of Forney Run Channel. $25,249. Maturity in spring.

Pa., Hanover Twp. — Hanover Twp. Comn., Newtown, plans constructing dike from Wilkes-Barre City line to Carey Ave. bridge, Hanover Twp. $105,000. Maturity indefinite. J. Langen, Newtown, twp. engr.

★†**Washington**—U. S. Eng., Portland, Ore., plans flood control in Woodland Dist. $220,000; Kilama Dist. $240,000; Kelso Dist. $140,000; Longview Dist. $350,000; Coal Creek Dist. $95,000, all in Cowlitz Co.

Wash., Aberdeen — Port of Grays Harbor, W. J. Murphy, mgr., ft. Myrtle St., plans constructing fish boat base for 350 boats. $80,000.

Wash., Vancouver—Clark Co. plans drainage for 200 mi. of roads, deepening roadside and run-off ditches, construction serviceable crowns and shoulders. $176,008. C. E. Deako, Vancouver, engr.

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†**Wash., South Aberdeen**—U. S. Eng., Federal Bldg., Seattle, plans diking and flood control work. $184,000. W.P.A. funds allotted, city now must raise its share.

★**Canada**—Dpt. Marine, N. B. McLean, ch. engr., Ottawa, Ont., Dominion Govt. estimates for the fiscal year ending Mar. 31, 1937, dredging River St. Lawrence Ship Channel $2,000,000; Dpt. Railways & Canals, A. E. Dubuc, Ottawa, Ont., general improvements to canals, $270,000.

Canada—Dpt. Railways & Canals, Col. A. E. Dubuc, Ottawa, Ont., main estimates for the fiscal year ending Mar. 31, 1937, construction and betterments Hudson Bay Railway and terminals, $215,000, construction and betterments Welland Ship Canal, $60,000; Dpt. Pub. Wks., K. M. Cameron, engr., Ottawa, Ont. repairs and improvements to wharf and buildings at R.C.N. Baracks and H.M.C. docks yards Halifax, N. S., $75,000, repairs to harbour works, St. John, N. B., $20,000, rebuilding track foundation on wharf, Rimouski, Que., $66,000, dredging Maritime Provinces, $500,000, dredging Ontario and Quebec, $320,000, dredging Manitoba, Saskatchewan and Alberta, $50,000, dredging British Columbia, $185,000, reconstruction of North Shore St. Lawrence telegraph system from Shelter Bay eastward, $10,000, repairs and improvements to Saskatchewan and Alberta telegraph and telephone lines, $15,000, repairs and improvements to telegraph system, Northern Dist., British Columbia, $6,000, Vancouver Dist., $9,000, repairs and improvements to telegraph system, Yukon, $15,000.

Ont., Niagara Falls—Canadian Niagara Power Co., Queen Victoria Park, J. Lawson, genl. supt., plans concrete dam to project 900 ft. into Niagara River opposite power plant. $200,000. N. R. Gibson, Lewiston Heights, N. Y., engr.

BIDS ASKED

Conn., Bridgeport—See "Contracts Awarded."

†**Louisiana**—Mar. 3 (extended date) by U. S. Eng., Prytania St. and River Front, New Orleans, dredging 420,000 cu.yd. in Lake Mongoulois Channel extension. Noted Jan. 29, C.D. —Feb. 6, E.N.-R.

†**Me., Eastport**—Mar. 10, by U. S. Eng., Eastport, excavating for navigation lock at Treat Island, Passamaquoddy Bay Dam and Power Project, incl. 350,000 cu.yd. excav., Spec. 284-36-408.

Mass., South Hadley — See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Turlock—Turlock Irrigation Dist. Directors, 117 West Main St., constructing canal and levee in main canals of district, 28,000 sq.ft. canal lining, Schedule 10, to E. Erickson, Route 4, Box 744, Modesto, $2,520; 411,630 sq.ft. canal lining and certain concrete structures, to L. Terrell, 221 9th Ave., Turlock, $34,412. P.W.A. Bids Jan. 14. Received no bids Jan. 14, on other units of work and bids will probably be asked at a later date on such unbid works. Total cost estimated at $165,000. Noted Jan. 22, C.D.

Conn., Bridgeport—City, P. Brewster, dir. P. Wks., retaining walls, etc., wing wall and coffer dam Ash Creek, $4,375; concrete dam on Pequonnock River, $6,602; retaining wall, basin and drying platform, $3,852; repairing stone and concrete walls on various public properties, $15,895, W.P.A. labor. Grand total $30,724. F. Toquet, City Hall, engr.

Ia., Council Bluffs—City Council, constructing Sect. 2, Indian Creek Flood Control Project, to Union Constr. Co., 1110 Locust St., Des Moines, $298,400. P.W.A. Bids Feb. 12. Noted Jan. 30, C.D.

★†**Mass., Boston**—U. S. Eng., Custom House, dredging channel to Navy Dry Dock 3, at South Boston, to Morris & Cummings Dredging Co., 44 Whitehall St., New York, N. Y., $1,240,644. Noted Feb. 18, C.D.

Mass., South Hadley—Town, H. A. Bagg, chn. Bd. Selectmen, Town Office, constructing rein.-con. retaining wall, day labor, under W.P.A. $38,000.

Wash., Yakima—See "Materials and Equipment."

UNCLASSIFIED

PROPOSED WORK

Calif., Huntington Park—SWIMMING POOL—City made application to P.W.A. for assistance in financing construction of swimming pool in municipal park. $120,000. V. Wood, City Hall, engr.

†**Calif., Los Angeles** — AIR BASE — U. S. Navy Dpt., Wash., D. C., completing plans air base on 350 acre site on Terminal Island, incl. facilities for sea and land planes, hangars, runways, ramps, docks, relief forces. W.P.A. project. $483,000.

• **Calif., Taft**—GRANDSTAND, etc.—Lincoln High School Dist. plans by C. H. Biggar, Haberfelde Bldg., Bakersfield, athletic field incl. rein.-con. grandstand and bleachers, bandstand, etc., at Lincoln High School. $100,000.

Calif., Taft—GRANDSTAND—Taft Union High School Dist., Taft Union High School Dist., plans by C. H. Biggar, Haberfelde Bldg., Bakersfield, rein.-con. grandstand, Lincoln School Grounds. $100,000.

†*Federal Government.*

Unclassified (Continued)

Conn., **Ansonia**—ATHLETIC FIELD—City, Mayor's Office, City Hall, making plans constructing athletic field Colony St., $30,465. V. Clarke, Mayor's Office, City Hall, engr.

Conn., **Ansonia**—SWIMMING POOL—City, Mayor's Office, City Hall, making plans outdoor swimming pool, Holbrook Park. $41,224. W.P.A. project awaiting Washington approval. V. Clarke, Capitol Bldg., engr.

Conn., **Greenwich**—GAS SERVICE EXPANSION—Greenwich Gas Co., 253 Greenwich Ave., preparing plans gas pipe mains; purchase of gas meters and equipment service connections. $45,000. Private plans.

Conn., **Hartford**—AIRPORT ENLARGEMENT—City, c/o Aviation Comm., plans by J. Berenson, 54 Church St., J. Gelman, 650 Main St., C. C. West, 52 Kenyon St., and F. W. Whiton, 805 Main St., administration building at airport, Brainard Field, $80,000, as part of $318,000 improvement program. W.P.A. project. Noted Feb. 17, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

Kan., **Kansas City**—UNDERGROUND LINE—City plans transmission line on 7th Ave. bridge over the Kaw River. $50,000.

Louisiana—OIL PIPE LINE—Continental Oil Co. of Nevada, Lake Charles, appointed F. Shutts & Sons, engrs., Lake Charles, to supervise construction of 44 mi. 6 in. and 44 mi. 8 in. line from Tepetate Gas & Oil Field in Acadia Parish to Lake Charles, also construction of deep water terminal at Lake Charles on Calcasieu River which will include loading docks, 80,000 bbl. storage tank and Diesel powered centrifugal pump with 10,000 bbl. an hour capacity.

Louisiana — STEEL PIPE LINE — Magnolia Pipe Line Co., Shreveport, plans 25 mi. 6 or 8 in. steel pipe line from Dixie to Rodessa. $150,000.

La., **Lake Charles**—OIL PIPE LINE—Stanolind Oil & Gas Co., seeking permit from War Dpt. to lay three 4 in. oil lines pipe at a depth of 2 ft. under and across bed of Kelso Bayou, 5,000 ft. above its mouth, near Kackberry, Cameron Parish.

†**Massachusetts**—BOAT HOUSES, etc.—U. S. Coast Guard Headquarters plans constructing boat houses and launchways at Gay Head, Hull, Gloucester and Nantucket; and garage and workshop at Coskata Station, Nantucket.

Mass., **Lawrence**—SWIMMING POOL—City, W. A. Griffin, mayor, City Hall, plans nearing completion 137x154 ft., brick, rein.-con. swimming pool, 57x84 ft., brick, steel bathhouse, concrete found., Bodwell St., Ward 5. $60,000. Owner will probably do work by day labor in spring. Noted Aug. 12, C. D.—Aug. 16, E. N.-R.

†**Mass., Marblehead Neck**—PLOTTING STATION—U. S. Eng., plans constructing plotting station, incl. bases for 6 anti-aircraft guns, and 2 heavy coast guard guns, also 96 ft. tower.

Mass., **Northampton** — SPRINKLERS — City, J. L. Lucier, ch. Fire Dpt., 60 Masonic St., recommended installation of new sprinklers in basement of all schools, also purchase of 1,000 ft. new fire hose for Fire Dpt.

Mich., **Muskegon**—PETROLEUM DEVELOPMENT—Oil Finders, Inc., c/o Old Dutch Refining Co., Muskegon, plans development of petroleum producing properties in Muskegon and other central Michigan oil fields, incl. drilling wells, piping, connections, etc. $50,000 or more. **Maturity at once.** Private plans.

Minnesota — RURAL ELECTRIFICATION—Northern States Power Co., 15 South 5th St., Minneapolis, plans constructing rural electrification system. To exceed $100,000. Byllesby Eng. & Management Co., 231 South La Salle St., Chicago, Ill., engrs.

Minn., Austin—LAKE—City plans developing East Side Lake, dredging, landscaping, etc. $40,000. Will seek W.P.A. funds. G. Brown, city engr.

Mont., Bozeman—PARK—City, C. Westlake, clk., making plans constructing park improvements, grading and fencing baseball park, bleachers, constructing outdoor swimming pool, Bozart's Grove; also skating rink, hard-surfaced tennis courts in three parks, installing flood lighting for certain courts. To exceed $23,000 (not official). L. S. Thorpe, city engr.

Neb., Mitchell—RURAL ELECTRIFICATION—Roosevelt Rural Public Power Dist., Mitchell, has been granted authority by State Ry. Comm. to construct and operate transmission lines. $310,000. Henningson Eng. Co., Union State Bank Bldg., Omaha, engrs. Noted Nov. 18, C. D.—Nov. 21, E. N.-R.

N. J., Jersey City—FIELD HOUSE, TRACK—City, Dpt. Parks & Public Property, City Hall, plans outdoor board running track and field house at Montgomery Park Annex. $25,602. City supply labor and equipment. W.P.A. furnishes material. Applied for W.P.A. loan. H. Clark, City Hall, engr.

N. J., Jersey City — GREENHOUSE — City, Dpt. Parks & Pub. Property, applied for W.P.A. loan for constructing concrete, wood frame greenhouse, at Merseles St., for Montgomery Park Annex. $30,000. City will supply labor and equipment, W.P.A. materials. H. Clark, City Hall, engr.

N. Y., Auburn—BROADCASTING STATION—Auburn Publishing Co., 34 Drill St., plans constructing broadcasting station. Architect not appointed.

N. Y., Brooklyn—RECREATION BUILDING, etc.—Dpt. Parks, Arsenal Bldg., Central Park, New York, plans by A. Embury, c/o owner, recreation building and comfort station, Colonial Rd. opposite 67th St. Est. about $30,000.

N. Y., Elmhurst — FIELD HOUSE — Bd. Educ., 500 Park Ave., New York, plans by C. W. Martin, Flatbush Ave. extension and Concord St., Brooklyn, 1 story, 29x85 ft., field house, 56th Ave. and 90th St. $55,000.

N. Y., Jamaica—LOCKER HOUSE, etc.—Dpt. Parks, Arsenal Bldg., Central Park, plans constructing 1 story, brick locker house, for tennis courts, $38,000; and 1 story, 22x50 ft., brick comfort station, to exceed $10,000, both at Hillside Park. A. Embury, 2nd, c/o owner, archt.

N. Y., New York—BASEBALL PARK ADDITION—Yankee Stadium, River Ave. and 157th St., completing plans new concrete bleacher section 13,000 seating capacity for ball park grand stand addition. Osborn Eng. Co., 7016 Euclid Ave., Cleveland, O., engrs.

N. Y., New York—BLEACHERS—Dpt. Parks, Arsenal Bldg., Central Park, plans by A. Embury, 2nd, c/o owner, 1 story, 40x360 ft., rein.-con. bleachers, Macomb Dam Park. $135,000.

N. Y., New York—ELECTRICAL WORK—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, soon takes bids electrical work, steam and water piping, platform fittings, etc., for station facilities. $156,000.

North Carolina—INDUSTRIAL RAILROADS—E. F. Still, c/o Z. Vance Norman, Plymouth, plans constructing 2 logging railroads in Bertie Co., one located ½ mi. south of Merry Hill on road leading to Sans Souci and other 1½ mi. southeast of Merry Hill road leading to Avoca.

North Carolina—INDUSTRIAL RAILROAD—Rowland Lumber Co., New Bern, plans logging railroad on Route 101, in Craven Co., 2.7 mi. south of Bells Branch. R. G. Turnbull, representative.

O., Wooster—GRANDSTAND—Wayne Co. Agricultural Society, making plans for steel frame grandstand, 3,500 rein.-con. seats, Osborn Eng. Co., 7016 Euclid Ave., Cleveland, engrs.

Oklahoma—OIL and GAS DEVELOPMENT—Corporation, c/o O. Askins, 510 Northwest 21st St., Oklahoma City, plans oil and gas development, at Oklahoma City Oil Fields. To exceed $50,000.

Oklahoma—OIL and GAS DEVELOPMENT—Corporation, c/o B. Cunningham, Jr., 317 West Park St., Oklahoma City, plans oil and gas development, Hanbury Oil Fields. $50,000.

Oklahoma—OIL and GAS DEVELOPMENT—Owner, c/o General Industries Corp. Ltd., 530 West 6th St., Los Angeles, Calif., plans oil and gas development, in John Fitts Oil fields, Pontotoc Co. $50,000 or more.

Oklahoma—OIL and GAS DEVELOPMENT—Roles Co., City Centre Bldg., Phila., Pa., plans oil and gas development, Edmond Oil Fields. To exceed $50,000.

Oklahoma — RURAL ELECTRIFICATION—Oklahoma Gas & Electric Co., 321 North Harvey St., Oklahoma City, plans constructing rural electrification program. To exceed $100,000. Byllesby Eng. & Management Co., 231 South LaSalle St., Chicago, Ill., engrs.

Okla., Oklahoma City—GAS LINE—Phillips Petroleum Co., Bartlesville, made final plans constructing 7,300 lin.ft. 24 in. wet gas line on 30th St. $35,000. A. H. Riney, Bartlesville, engr.

Okla., Oklahoma City—GAS COMPRESSOR STATION—Phillips Petroleum Co., Bartlesville, made final plans 1,500 hp. gas compressor station, 28th and Prospect Sts. $35,000. A. H. Riney, Bartlesville, engr.

Pa., Allentown—AIRPORT IMPROVEMENTS—City, City Hall, plans paving runways and constructing hangars. $150,000. Probably W.P.A. project.

Pa., Altoona — AIRPORT — City, City Hall, making plans improving Stutz field into modern municipal airport, incl. hangars, runways, administration building and lighting system. $291,000. Will submit to W.P.A. for reconsideration soon. H. J. Baum, city engr.

Pa., Braddock—CAR DUMPER—Carnegie Illinois Steel Co., Carnegie Bldg., Pittsburgh, appropriation made for construction of new car dumper to replace old one at Edgar Thomson Steel Works, to take care of large and new type cars, together with new and up-to-date interlocking signal system.

Pa., Coudersport—GAS LINES—Service Gas Co., Inc., plans pipe lines, distribution systems, etc., to furnish natural gas to domestic industrial and commercial users in McKean, Potter and Tioga Counties. To exceed $23,000. Application made to Public Service Comm.

Pa., Wellsborough — AIRPORT DEVELOPMENT—Boro, c/o Secretary, Boro Bldg., plans grading field, constructing runways and hangar at airport. $114,000. Probably W.P.A. project.

†*Federal Government.*

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Unclassified (Continued)

†R. I., Newport—FERRY SLIPS—Navy Dpt., Wash., D. C., plans constructing 2 wood pile, timber ferry slips with mechanical lifts at Naval Torpedo Station and Government Landing. $40,000 each.

S. D., Rapid City—PARK—City, C. I. Leedy, c. aud., made plans constructing park improvements, incl. underground sprinkler system, at Halley Park, straight creek and riprap banks, fill swamp to enlarge skating rink. $25,000. W.P.A. project. L. Kiel, supt. Streets & Parks.

Texas—OIL and GAS DEVELOPMENT—Corporation, c/o J. G. Ellinghausen, Kennedy Bldg., Tulsa, Okla., plans oil and gas development in East Texas Oil Fields. To exceed $100,000.

†Tex., Galveston—POWER LINE—Yards & Docks, Navy Dpt., Wash., D. C., soon takes bids on revised plans replacing power line at Naval Radio Direction Finder Station, Spec. 8145. Former bids rejected.

Virginia — RURAL ELECTRIFICATION — Farmers Rural Utilities, Inc., Bowling Green, plans 400 mi. rural electrification in Spotsylvania, Caroline, Hanover and Orange Counties. $366,000. Private plans.

Wash., Asotin—AIRPORT—Asotin Co., J. N. Haven, chn., plans airport, grading, runways and lighting. $30,000; recreational projects, $26,000. Total est. $56,000. P.W.A. available.

Wash., Eagledale — WHARF, etc. — Puget Sound Navigation Co., Colman Dock, Seattle, plans wharf and ferry slip, here. $30,000. Owner has asked permission of the State Dpt. P. Service to abandon its present wharf at Port Blakeley. Decision expected middle of March, after which bids will be called if decision is favorable.

Wash., Seattle—RAILS—Municipal Railway, County-City Bldg., laying new rails in Westlake St. from Pine to Roy Sts. Bd. P. Wks. approves request of A. E. Pierce, Ry. Supt., to City Council, for $53,191 to buy new rails and other materials. Est. $84,811. T. R. Beeman, County-City Bldg., engr.

Wisconsin — RURAL ELECTRIFICATION—Wisconsin Public Service Co., 1029 North Marshall St., Milwaukee, plans rural electrification. To exceed $100,000. Byllesby Eng. & Management Co., 231 LaSalle St., Chicago, Ill., engrs.

Wyo., Reliance—COAL HANDLING PLANT—Union Pacific Coal Co., c/o E. McAuliffe, 5610 Farnam St., Omaha, Neb., plans coal handling plant. $235,000.

Canada—WHARFS, TELEGRAPH SYSTEM, etc.—See "Earthwork, Irrigation, Drainage and Waterways."

Ont., Ottawa—FIRE ALARM SYSTEM—City Council will ask Ont. Provincial Govt. to pass necessary Legislature for issue of debenture for $150,000 for new fire alarm system, incl. building $20,000, station equipment $15,000, fire alarm equipment $88,500, outside system, boxes, etc., $26,500. S. B. Blackler, fire ch. Noted July 17, C. D.—July 25, E. N.-R.

★ **Que., Montreal**—BATHING BEACH—J. E. Blanchard, dir. Civic P. Wks., preparing plans for expenditure on Saint Helen's Island, incl. construction of bathing beach, levelling reclaimed land, baseball and football grounds, playground, picnicking facilities, etc. $500,000. **Maturity in spring.**

Que., Quebec City—LAMP POSTS—City, E. Hamel, engr., preparing plans replacing present lamp posts with 3 lights by posts with 1 single powerful light suspended by a logically constructed supporting arm.

Sask., Regina—POLICE SIGNAL SYSTEM—Municipality bids in spring installing police signal system.

Alaska, Juneau—TRANSMITTING STATION—U. S. Signal Corps, Federal Bldg., Seattle, Wash., plans radio transmission station. $34,563.

BIDS ASKED

Ariz., Clifton—BALL PARK—See "Contracts Awarded."

†Calif., Los Angeles—AIR BASE—See "Contracts Awarded."

Calif., Palo Alto—GAS DISTRIBUTION CENTER—See "Contracts Awarded."

Colo., Alamosa—AIRPORT—See "Contracts Awarded."

Conn., Bridgeport — PLAYGROUNDS, etc. — See "Contracts Awarded."

Conn., Greenwich — RECREATION PARKS, etc.—See "Contracts Awarded."

Conn., Shelton—PLAYGROUND—See "Contracts Awarded."

†Ky., Fort Knox—GAS LINE, etc.—Mar. 12, by Con. Q.M., gas line, electric transmission line and control cables for water filtration plant. $30,000.

Mass., Boston—SIGNAL EQUIPMENT—Mar. 4, by City, E. M. McSweeney, police comr., 154 Berkeley St., installing signal equipment for Police Dpt., P.W.A. Docket 8200. $35,000. Jackson & Moreland, 31 St. James Ave., engrs.

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N. Y., Brooklyn—RECREATION BUILDING, etc.—See "Contracts Awarded."

N. Y., Niagara Falls—CONDUIT, etc.—See "Contracts Awarded."

†S. C., Charleston—DOCK—Mar. 11, by U. S. Eng., Charleston, encasing with concrete jacket at least 3 in. thick and 9 ft. long, 80 supporting piles for creosoted timber addition to U. S. Dock, Waterfront. $2,000.

Wash., Tacoma—DUCTS, VAULTS, etc.—See "Contracts Awarded."

Que., Rimouski — TRACK FOUNDATION — Mar. 3, by Secretary P. Wks., Ottawa, Ont., constructing railroad track foundation, involving 252,839 ft. B.M. demolition, 14,085 cu.yd. excav., 910 units creosoted bearing piles, 258,248 ft. B.M. creosoted square timber, 184,719 ft. B.M. new floor stringers and floor. $66,000. K. M. Cameron, Ottawa, Ont., engr.

CONTRACTS AWARDED

Ariz., Clifton—BALL PARK—City, enlarging ball park to 320x450 ft. with 4½ lap athletic track, regulation football field, baseball field, stone beachers, reconstructing grand stand, constructing retaining wall, by relief labor. **W.P.A.** $23,280. D. Norti, town street foreman.

Calif., Palo Alto—GAS DISTRIBUTION CENTER—City Council, moving and reconstructing gas distribution center on Middlefield Rd., force account. Est. $28,300. **P.W.A.**

Calif., San Francisco — RAILS — Western Pacific R.R., R. R. Mills Bldg., 10,000 tons steel rails, to Columbia Steel Co., Russ Bldg.; 21,000 tons, to Colorado Fuel & Iron Co., Pueblo, Colo. Noted Jan. 15, C.D.—Jan. 23, E.N.-R., under "Contracts Awarded."

Colo., Alamosa—AIRPORT—City, constructing municipal airport, day labor. $48,811. W.P.A. project.

Conn., Bridgeport—PLAYGROUNDS, etc.—City, P. Wks. Dpt., rough grading second part new Seaside Park playgrounds, $64,088; developing 90 acres at Wheeler Memorial Park public playground and recreation facilities for picnics, etc., relief labor. P. Brewster in charge. $85,389. W.P.A. project. F. Toquet, City Hall, engr.

Conn., Greenwich—RECREATION PARKS, etc.—Town, Dpt. Streets, public property for tennis courts, incl. filling, grading, etc., $56,075; playground construction, school grounds, parks. W.P.A. labor. $60,200. P. L. Minor. Town Hall, engr.

Conn., New London—PIER IMPROVEMENTS—State, Rivers, Harbors & Bridges Comn., W. E. Clarke, pier improvements, incl. roofing, flashing, skylights, etc., to C. G. Bostwick, Francis Ave., Hartford, $6,958•••dredging and fender planking, to Merritt, Chapman & Scott, 292 Pequot Ave., $20,000 and $34,055 respectively. Grand total $61,013. Est. $60,000. **P.W.A.** Bids Feb. 6. Noted Feb. 14, C.D.—Jan. 16, E.N.-R.

Conn., Shelton—PLAYGROUND—Town, Bd., Selectmen, grading, erecting fence, Commodore Hull School Playground, W.P.A. labor. Est. $31,278. V. Clarke, Capitol Bldg., Ansonia, engr.

Ill., Wilmette—PARK IMPROVEMENTS—Wilmette Park Dist., c/o F. M. Scheidenhelm, treas. park paving and tennis courts, to C. R. Peterson Constr. Co., 5659 North Newark Ave., Chicago, $35,234. **P.W.A.** Bids Dec. 5. Noted Dec. 4, C.D.

†Mass., Boston—ELEVATOR DOORS, etc.—Yards & Docks, Navy Dpt., Wash., D. C., elevator doors and equipment at Navy Yard, Boston, to A. B. See Elevator Co., Inc., 164 Stuart St., $3,312.

Minn., Rochester—SWIMMING POOL—City, Bd. Park Comrs., J. A. Starkey, secy., constructing 60x300 ft. swimming pool, bathhouse in Soldiers Field, to G. Schwartz & Co., Rochester, $54,450. **P.W.A.** Bids Feb. 10. Noted Jan. 29, C. D.—Jan. 23, E. N.-R.

N. M., Deming—GAS DISTRIBUTION SYSTEM—City, natural gas distribution system, to J. A. Mahoney, Inc., Deming, $33,896. **P.W.A.** Bids Nov. 30. C. B. Morgan, Deming, engr.

N. Y., Brooklyn—RECREATION BUILDING, etc.—Dpt. Parks, Arsenal Bldg., Central Park, New York, constructing 1 story, 54x94 ft., brick recreation building and wading pool, 477 Jamaica Ave., **W.P.A.** day labor. $65,000. Owner now purchasing materials, etc.

N. Y., Fredonia — LIGHT SYSTEM — See "Streets and Roads."

N. Y., Niagara Falls—CONDUIT, etc.—City, W. D. Robbins, city mgr., constructing 8,600 ft. underground conduit line in Pine Ave. for fire and police alarm system $21,942 storm sewer in alley between Michigan and Weston Aves. $5,152; 10 in. storm sewer in alley between Lynwood and Michigan Aves. $1,668, by day labor. Grand total $28,762. H. Wesley Clark, city engr.

Okla., Konawa—PIPE LINE—Magnolia Petroleum Co., Magnolia Bldg., Dallas, Tex., constructing 18 mi. 8 in. pipe line from Konawa to Fitts oil pool in Pontotoc Co., to Mitchell Stewart, Magnolia Bldg., Dallas, Tex., $70,000. Est. $75,000. Awarded Feb. 15.

†Pa., Phila. — PIER ELEVATOR — Yards & Docks, Navy Dpt., Wash., D. C., repairing elevator for freight and passenger elevator [illegible] 350 ton crane, Pier 4, at Navy Yard, to [illegible]ing-house Electric Elevator Co., 3001 Wal[illegible] St., $2,775.

Pa., Warren—AIRPORT—Boro, constructing municipal airport in West End, incl. administration building, runways, flood lighting system, hangars, beacons, etc., day labor under supervision of C. Barwis, boro engr., Bo[illegible] Hall. $172,500. Will purchase $10,000 materials. **Maturity in March.**

R. I., Cranston—STADIUM—City, Bd. Contr. & Purchases, City Hall, constructing [illegible]x305 ft., rein.-con. bleachers, at athletic field, to Central Eng. & Constr. Co., 210 Main St., Pawtucket, $54,600. **P.W.A.** Bids Jan. 13, awarded Feb. 13. Noted Jan. 10, C.D.

Texas and Louisiana—PIPE LINE—Eastern Texas Petroleum Co., Tower Bldg., Dallas, Tex., 55 mi. 8 in. Lindeveld pipe line from Longview, Tex., to Rodessa, La., to Apex Constr. Co., 2nd Natl. Bank Bldg., Houston, Tex.

Tex., Fort Worth—AIRPORT BUILDING—City, c/o G. D. Fairtrace, mgr., general contract 2 story, tower, 74x175 ft. airport building, Meacham Field, to Quisle & Andrews, 2212 West 7th St., $113,961•••heating, to General Eng. Co., Majestic Bldg., $8,997•••plumbing, to Young & Pratt, Barton Springs Rd., Austin, $5,590•••electric wiring, to State Electric Co., 1607 Vaughn St., $3,737. Grand total $132,985. Est. $125,000. **P.W.A.**

Wash., Seattle—WHARF—Pacific Coast Co., Smith Tower, rebuilding Piers A and C around Pier B to provide 230x700 ft. wharf, a depressed double railroad track will be installed on one side and truck loading ramp on the other, wharf, piling and dredging, awarded to Puget Sound Bridge & Dredging Co., 2929 16th St. S.W.•••furnishing lumber, Pier 6, to C. R. McCormick Co., White Bldg.•••piling, to West Coast Wood Preserving Co., 1118 Fourth St. Est. $125,000. W. Aitken, 1501 10th St. N., engr.

Wash., Tacoma—DUCTS, VAULTS, etc.—City Light Dpt., City Hall, installing ducts, vaults, manholes for underground services in Court C from South 7th to 15th Sts., South 7th St. from Court A to Commerce St., South 9th St. from Court A to St. Helens Ave., South 11th St. from Court A to Court C, South 15th St. from Court A to Court C, South 13th St. from Broadway to Court C, by force account. $54,000. V. Kent, City Hall, engr.

MATERIALS AND EQUIPMENT

PROPOSED WORK

†CHAIN BUCKET ELEVATORS, etc. — **Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., rejected bids Jan. 6, 2 each chain bucket elevators and standard gravel bin. Noted Jan. 17, C.D.

CONCRETE MIXING and PLACING UNIT—**Los Angeles, Calif.**,—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., rejected bids Oct. 10, furnishing new mechanical concrete mixing and placing unit complete with mechanical placer, alternate same with pneumatic placer without agitation, alternate either of above items in rental basis for 1 year for rental price per cu.yd. of concrete placed in tunnel, f.o.b. Lone Pine, Spec. 1787. Noted Sept. 26, C.D.

†POLES—**Los Angeles, Calif.**—U. S. Forest Service, 751 South Figueroa St., rejected bids Jan. 27, 400 each 20 ft. poles, Class 6 pressure treated. $1,000.

ROAD OIL—**Los Angeles, Calif.**—A. J. Holm, city purch. agent, rejected bids Feb. 11, furnishing 80% and 90% road oil for period ending June 30, estimated quantities 1,000 tons per month f.o.b. McPherson St. plant, 450 tons per month, f.o.b. Hewitt St. plant, Spec. 3455. Will readvertise. Noted Feb. 20, C.D.

OIL TANKS—**Bridgeport, Conn.**—Metro Oil Co., 1500 Barnum Ave., plans expansion to include four 20,000 oil storage tanks.

OIL TANKS—**Bridgeport, Conn.**—Tidewater Oil Co., 150 Bostwick Ave., plans erecting two 24,000 gal. tanks and one 12,000 gal. tank for fuel oil and kerosene.

SNOW EQUIPMENT—**New Britain, Conn.**—City, P. Wks. Dpt., G. Molleur, engr., plans purchasing new snow removal equipment, incl. snow loader, 10 plows and bull dozer for breaking drifts. $10,000 or more.

WATER PIPE—**Abbeville, La.**—City plans purchasing 1,600 ft. 6 in. water pipe to complete water distribution system now under construction.

PUMPING ENGINE — **Athol, Mass.** — Town, Bd. Selectmen, 584 Main St., appropriated funds for purchase of 500 gal. pumping engine for Station 1. $3,300.

ROAD OIL—**Athol, Mass.**—Town, 584 Main St., Selectmen's Office, appropriated $5,000 for purchase of asphaltic road oil.

TRUCKS, etc.—**Billerica, Mass.**—Town, Bd. Selectmen, Town Hall, plans purchasing 2 trucks for Hy. Dpt. and 1 for Water Dpt., $3,000; fire pumping engine for Fire Dpt., $9,000; sprayer for Park Dpt., $1,100.

FIRE TRUCK—**Edgartown, Mass.**—Town, W. B. Norton, chn. Bd. Selectmen, plans purchasing ladder fire truck. $8,500.

Materials, etc. (Continued)

TRUCK—**Millis, Mass.**—Town. C. A. Smith, chn. Bd. Selectmen, plans purchasing forest truck. $2,000.

ROAD GRADER—**Palmer, Mass.**—Town. D. J. Dean, chn. Bd. Selectmen, Town Hall, plans purchasing road grader. $1,700 appropriated.

TRACTOR and PLOW—**Tewksbury, Mass.**—Town. I. F. French, chn. Bd. Selectmen, Town Hall, plans purchasing tractor and plow. $4,800 approved for purchase.

TRACTOR, etc.—**Westminster, Mass.**—Town. P. H. Loughlin, chn. Bd. Selectmen, Town Hall, plans purchasing tractor and snow plow. $6,000 appropriated.

UTILITY TRUCK—**Williamsburg, Mass.**—Town. S. Snow, chn. Bd. Selectmen, Town Hall, plans purchasing new light utility truck. $1,100 appropriation made.

PUMPING ENGINES, etc. — **Minneapolis, Minn.**—City, c/o Fire Dpt., A. R. Traeger, ch. engr., soon takes bids purchasing two 1,000 gal. pumping engines, one hose wagon and one 75 ft. aerial ladder truck and tractor.

TRUCKS — **Red Wing, Minn.** — City, S. T. Irvine, clk., plans purchasing 4 trucks.

STORAGE TANK—**St. Louis, Mo.**—Monsanto Chemical Co., 1700 South 2nd St., granted permit to install 15,000 gal. underground steel tank for storage of paraffine in Kosciusko St. between Soulard and Lesperance Sts.

TANK—**St. Louis, Mo.**—Central Terminal Co., 710 North 12th St., applied for permit to install one 550 gal. underground steel tank, at 820-22 Hadley St.

TANK—**St. Louis, Mo.**—E. F. Eichorn, 2710 University St., applied for permit to install 1,000 gal. underground steel tank for gasoline, 2710 University St.

TANK—**St. Louis, Mo.**—A. J. Getz, 1729 North 11th St., applied for permit installing one 1,000 gal. underground steel tank for gasoline, 1729 North 11th St.

TANKS — **St. Louis, Mo.** — I. A. Hernreich, 6001 Fyler Ave., awarded permit to install three 1,000 gal. underground steel tanks for gasoline at 6001 Fyler Ave.

TANKS — **St. Louis, Mo.** — E. Kapros, 409 South 14th St., applied for permit to install two 1,000 gal. underground steel tanks for gasoline in automobile filling station, 409 South 14th St.

TANKS—**St. Louis, Mo.**—Elizabeth Wiggenhauser, 509-11 South 2nd St., applied for permit to install one 1,000 gal. underground steel tank for gasoline, 509-11 South 2nd St.

STEEL TANKS, etc.—**Buffalo, N. Y.**—C. M. Smith, 281 Englewood St., plans installing 500 gal. steel tanks, electric pump, air compressor, etc., at gasoline service station, 281 Englewood St. To exceed $1,000.

TANK—**Buffalo, N. Y.**—A. G. Collier, 945 Tonowanda St., plans purchasing gasoline storage tank, 983 Tonowanda St., To exceed $1,000.

SNOW PLOWS — **Hempstead, N. Y.** — Town Bd. authorized Highway Superintendent Patterson to purchase 4 snow plows. $300 each.

TRUCKS, etc.—**Rome, N. Y.**—Bd. Estimate & Contracts plans purchasing several trucks and snow removal equipment. **Maturity soon.** R. P. Wilson, comr.

SNOW REMOVAL EQUIPMENT — **Rome, N. Y.**—City, R. P. Wilson, comr. Wks., plans purchasing new snow removal equipment, incl. heavy duty truck and plow. $18,000.

SODA ASH—**Grand Forks, N. D.**—City, C. J. Evanson, aud., plans 1 carload soda ash for filtration plant. E. L. Lium, city engr.

WIRE MESH FENCE—**Cleveland, O.**—Great Lakes Exposition Co., R. G. Frisbee, dir. Wks., 1803 Terminal Tower, writing specifications about 10,000 running ft. wire mesh fence, for proposed exposition fair.

MOTOR TRUCKS — **Dunmore, Pa.** — Boro. Boro Hall, plans purchasing fleet of motor trucks to haul ashes and for use of Boro Street Dpt. $8,000. S. Mastriani, boro engr.

STEEL TANKS—**Phila., Pa.**—Solgas, Inc., 1608 Walnut St., plans installation steel tanks, pumps, etc., at 6610 Wissahickon Ave. To exceed $1,000.

FIRE TRUCK—**Bellows Falls, Vt.**—Town. A. Chandler, village pres., Town Hall, plans purchasing fire truck. $4,500 approved for purchase of same.

POWER SHOVEL—**Anacortes, Wash.**—City Council orders issuance of warrants for purchase of power shovel. $2,000.

FITTINGS and PIPE — **Tacoma, Wash.** — Water Dpt. soon takes bids annual supply of galvanized fittings and pipe for stock. $1,700. W. A. Kunigh, City Hall, engr.

LADDER TRUCK—**Halifax, N. S.**—City Clerk soon takes bids for ladder truck for Fire Dpt. $4,500.

MOTOR—**Burlington, Ont.**—Burlington Water Comn. plans purchasing in spring 125 hp. motor.

†*Federal Government.*

BIDS ASKED

†TURBINE, etc.—**Arizona**—Mar. 16, by Bureau Reclamation, Denver, Colo., furnishing 1 vertical-shaft 11,500 hp., 214 r.p.m. hydraulic turbine, or new plate steel scroll case, speed ring and draft-tube liner for 11,500 hp. Morgan Smith Co. vertical-shaft hydraulic turbine now installed in Mormon Flat Power Plant, Salt Lake River Project; also 102 in. diam. butterfly valve. R. F. Walter, ch. engr.

MOTOR FIRE TRUCK, etc.—**Coalinga, Calif.**—E. McCroskey, city clk., taking bids 1½ ton truck chassis with dual rear wheels, and one 600 g.p.m. centrifugal fire pump and installing same on truck.

MOTOR GRADER — **Eureka, Calif.**, — A. W. Kildale, city clk., taking bids 1 motor grader.

PILES, etc.—**Santa Cruz, Calif.**—S. A. Evans, city clk., bids about Feb. 24, piles and lumber in connection with widening municipal wharf. To exceed $1,000.

†BARS, PLATES, etc.—**Wash., D. C.**—Mar. 10, by General Purchasing Officer Panama Canal, overhauling Pacific Locks, Panama Canal, incl. rolled nickel steel bars, manganese bronze bars, naval brass bars, carbon steel cover plates, structural steel bars, copper-nickel-alloy stud bolts, steel machine bolts, copper-nickel-alloy nuts, brass bolts, brass cotter pins, brass nuts, c.i. separators, copper-nickel-alloy separator pins and washers, brass shackle pins and washers, structural carbon steel angles and bars, culvert bulkheads, rolled nickel steel bearing plates, vanadium cast steel pintle bushings, cast bronze yoke bushings, mild steel stud bolts and jacking bolts, mild steel sleeve nuts, seamless brass pipe, babbitt metal, rubber seals, rubber seal segments, rubber seal strips, rubber gaskets, asbestos gaskets and cup shaped leather packings, etc.

LIME ROCK, etc.—**Florida**—Mar. 5, by State Road Dpt., C. B. Treadway, chn., J. H. Dowling, state hy. engr., Tallahassee, furnishing 15,000 tons lime rock and 8,185 gal. tar prime, TC-1, f.o.b. Arcadia, for Project 2012, Rd. 2, De Soto Co.; furnishing 245,448 MFBM untreated timber, Long Leaf Yellow Pine, 85% heart, f.o.b. Key West, for Project S-11, Rd. 4-A, Monroe Co.

RAILS—**Chicago, Ill.**—Chicago, Milwaukee & St. Paul & Pacific R.R., D. C. Curtis, purch. agt., Union Station, taking bids 30,000 tons steel rails.

STEEL RAILS—**Chicago, Ill.**—Chicago, Rock Island & Pacific R.R. Co., F. D. Reed, purch. agt., LaSalle St. Sta., taking bids about 35,000 tons steel rails.

LUMBER—**Allison, Ia.**—Mar. 3, by Butler Co. G. W. Hesalroad, aud., 69,100 ft. BM Class A and 4,533 ft. BM S4S lumber. O. W. Zack, co. engr.

LUMBER, etc.—**New Hampton, Ia.**—Mar. 3, by Chickasaw Co., 67,000 ft. BM untreated lumber; 41,000 ft. BM creosoted Southern yellow pine lumber; 1,753 ft. 15- to 48-in. culvert pipe. F. R. Lutford, co. engr.

LUMBER—**Tipton, Ia.**—Mar. 3, by Cedar Co., H. Onken, aud. 6 carloads Class D bridge lumber. H. L. Phelps, co. engr.

†FUSE INDICATORS—**Boston, Mass.**—Mar. 3, by Bureau Supplies & Accounts, Navy Dpt., Wash., D. C., fuse indicators: Mar. 6, for composition and steel valves, delivered to Boston Navy Yard. To exceed $1,000.

GRADER — **Red Wing, Minn.** — Mar. 3, by Goodhue Co., C. T. Taylor, co. aud., furnishing 1 or more power graders, 14 ft. blade, 50 or more hp. 16,000 lb. or more. Noted Oct. 28, C. D.—Oct. 31, E. N.-R.

CULVERT MATERIAL—**St. Cloud, Minn.**—Mar. 5, by N. Thomey, aud. Stearns Co., culvert material for construction on state aid and county aid roads for 1936.

†CRAWLER TYPE TRACTOR — **Vicksburg, Miss.**—Mar. 23, by U. S. Eng., P. O. Box 667, crawler type tractor, f.o.b. Greenville.

†PIPE, etc.—**Vicksburg, Miss.**—Mar. 10, by U. S. Eng., Box 665, furnishing, delivering spiral riveted or welded pipe, fittings for lightweight pipe and water pipe valves, f.o.b. point of shipment.

†TRUCKS — **Vicksburg, Miss.** — Mar. 9, by U. S. Eng., 2 new, inclosed-cab type trucks.

†VALVES—**Vicksburg, Miss.**—Mar. 23, by U. S. Eng., 667 Vicksburg, 225 valves for marine service, f.o.b. Vicksburg.

PIPE, etc.—**Fredonia, N. Y.**—Bd. Village Trustees, Village Hall, bids about Feb. 29, furnishing 424 ft. 24 in. vitreous tile sewer, connections, etc. Town Bd. Pomfret, Fredonia, will also purchase 230 ft. 12- to 24-in. drain pipe. To exceed $1,000.

ELEVATING GRADER, etc.—**Jamestown, N. D.**—Mar. 5, by A. R. Bartel, aud. Stutsman Co., one elevating grader, power take-off or engine driven, also one tractor, 60 hp.

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Materials, etc. (Continued)

CONVEYING MACHINERY—LeRoy, N. Y.—LeRoy Salt Co., Inc., S. Carr, pres., in market for transmission, conveying equipment, machinery and equipment for installation in salt mining operation at Lakeville.

LINE EQUIPMENT—New York, N. Y.—Mar. 10, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, miscellaneous line equipment for Independent City-Owned Rapid Transit Railroad, Contr. E-11.

HIGHWAY MACHINERY—Fargo, N. D.—Mar. 6, by F. F. Doherty, aud. Cass Co., furnishing any and all items of machinery for highway, incl. snow removal.

PIPE, etc.—Canton, O.—Mar. 5, by R. A. Bauhof, dir. P. Serv., c.i. pipe and fittings, wrought iron pipe and fittings, valves, curb and valve boxes, meters and meter repair parts. To exceed $1,000.

TRUCK BODIES—Elyria, O.—Walton Ice & Fuel, Inc., 671 East River St., taking bids for ten 1½ or 2 ton ice truck bodies. To exceed $1,000.

PNEUMATIC HAMMERS—Cincinnati, O.—Mar. 3, by H. F. Wagner, city purch. agt., furnishing pneumatic hammers to Hy. Maintenance Dpt.

TAR BINDER, etc.—Middletown, O.—Mar. 3, by L. F. Diefenbach, city engr., refined tar binder, asphalt binder, tar cut back, asphalt cut back, asphalt emulsion, road oil, H. T. tar, Q. T. tar, all as required during 1936.

†**SWITCHES—Portland, Ore.**—Mar. 13, by U. S. Eng., Portland, supplying 2,400 volt metal clad switches for powerhouse station service system at Bonneville.

TRUCK—Dale, Pa.—Mar. 10, by Dale Boro Council, F. Rhoades, secy., 810 Bedford St., 1½ ton highway truck, equipped with 2 yd. body and hoist. $3,500.

CEMENT, etc.—Martinsburg, Pa.—Mar. 2, by W. W. Zimmerman, secy., c/o North Woodbury Twp. School Dist., cement, sand, stone, lime, rough and dressed lumber, millwork, plastering materials, rough and finished hardware, paint, glass, steel sash and trusses, structural steel, roofing and sheet metal materials, plumbing materials, heating and ventilating equipment, and electrical equipment. To exceed $1,000. Hunter & Caldwell,, 3601 5th Ave., Altoona, engr.

CONE VALVES—Tacoma, Wash.—Mar. 23, by Bd. Contrs. & Awards, two 24 in. cone valves. W. A. Kunigh, City Hall, engr.

ROAD MACHINERY—Corpus Christi, Tex.—Mar. 9, by Nueces Co., c/o C. J. White, aud., Corpus Christi, furnishing one power controlled motor grader, weighing approximately 12,000 lbs. with 12 ft. blade, canopy top, for Precinct 1; one power controlled motor grader weighing 14,550 lbs. with 14 ft. blade, canopy top, for Precinct 3.

CABLE—Tacoma, Wash.—Mar. 12, by Bd. Contrs. & Award, 6,000 ft. 350 MCM, 4001-500 volt, 3 conductor or 18,000 ft. 350 MCM, 4001-5000 volt single conductor rubber insulated cable; 6000 ft. 1/0 4001-5000 volt, 3 conductor or 18,000 ft. 1/0 4001-5000 volt, 1 conductor rubber insulated power cable, 2,000 ft. No. 4, 4001-5000 volt, 3 conductor or 6,000 ft. No. 4, 4001-5000 volt, 1 conductor rubber insulated power cable, also 15,000 ft. 250 MCM and 1,000 ft. 500 MCM single conductor rubber cable. V. Kent, City Hall, engr. Bids Feb. 3 rejected. Noted Jan. 20, C.D.—Jan. 23, E.N.-R.

CATCH BASINS, etc.—Ottawa, Ont.—Mar. 19, by Secretary Bd. Control, catch basins, castings, draughting supplies, manhole steps and sewer pipe. $30,000. F. C. Askwith, Ottawa, engr.

CONTRACTS AWARDED

†**EMULSIFIED ASPHALT—Alameda, Calif.**—U. S. Eng., 52,000 gal. emulsified asphalt suitable for mixing with fine aggregate and on stabilization work on landing field at Benton Field Air Depot, to American Bitumuls Co., 200 Bush St., San Francisco, at 1c. per gal. Bids Jan. 10. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

†**MOTORS, etc.—Arizona**—Bureau Reclamation, Denver, Colo., motors, replacement parts, gate position indicators, altering 9 radial gates and hoists in spillway of Stewart Mountain Dam, Salt River Project, to Talley Iron Wks., Yakima, Wash. Bids Dec. 16. Noted Dec. 27, C. D.

RAILROAD TIES, etc.—Long Beach, Calif.—City Council, J. W. B. Blackman, engr., treated Douglas fir railroad ties and work timbers, etc., Spec. R-871, to Pan Pacific Piling & Constr. Co., 2145 East 25th St., Los Angeles, $13,015.

ASPHALTIC CEMENT—Los Angeles, Calif.—A. J. Holm, city purch. agt., furnishing asphaltic cement as required until June 30, from date of contract, Spec. 3463, to Richfield Oil Co., 555 South Flower St., $30,000. Bids Feb. 11, awarded Feb. 17.

†**CONCRETE MIXERS—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., furnishing two ½ cu.yd. concrete mixers, to Ransome Concrete Mchy. Co., Dunellen, N. J., $4,346. Bids Jan. 6.

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DUMP TRUCK BODIES, etc.—Los Angeles, Calif.—City, A. J. Holm, city purch. agt., 40 more or less standard bodies for 1½ ton street cleaning dump trucks, to Boyle Mfg. Co., 5100 Santa Fe Ave., $3,664; installing 40 hydraulic hoists, to Fager Co., 2667 East Slauson Ave., $8,600. Bids Jan. 21. Noted Jan. 28, C.D.

FIBER CONDUIT—Los Angeles, Calif.—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing 90,000 ft. straight 2- to 5-in. fiber conduit, Spec. 1876, to Westinghouse Electric & Supply Co., 905 East 2nd St., $8,952. Bids Feb. 10, awarded Feb. 13. Noted Feb. 6, C.D.

METER ADAPTERS—Los Angeles, Calif.—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., 2,000 ea. watt hour meter adapters, Spec. 1866, to Los Angeles Die Casting Co., 344 Crocker St., $4,700. Bids Jan. 28, awarded Feb. 13. Noted Jan. 21, C.D.

†**SEALING SOLUTION—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 19,000 gal. black and 3,000 gal. clear sealing solution, to Willard Warne Co., 656 South Los Angeles St., $3,835. Bids Feb. 13.

†**STEEL PIPE, etc.—Los Angeles, Calif.**—Treas. Dpt., Procurement Div., 1205 South Santee St., 4,200 lin.ft. 16 in. O.D. steel pipe, welded, black, to Southern Pine & Casing Co., Azusa, $3,738•••swimming pool equipment, to L. A. Cline, 3248 Long Beach Ave. E., $3,896 •••fire hydrants, to M. Greenberg & Sons, 3140 East 16th St., $1,241•••78 manhole frame and cover sets, to Apex Steel Corp., 6147 Eastern Ave., $1,365. Grand total $10,204. Bids Feb. 8, awarded Feb. 14.

†**STEEL WIRE—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 16 ga. black annealed steel wire, Proposal 405, to Northwestern Barb Wire Co., 1615 East 7th St., $4,680. Bids Jan. 31, awarded Feb. 11.

STRUCTURAL STEEL RADIAL GATES—Los Angeles, Calif.—Directors Metropolitan Water Dist., 306 West 3rd St., F. E. Weymouth, engr., structural steel radial gates, Schedule 1, f.o.b. bidders plant, Spec. 141, to Pacific Iron & Steel Co., 241 West Ave. 26, $6,459••• Schedule 3, f.o.b. cars and/or trucks, bidders' plant, to Los Angeles Valve & Fitting Co., 1650 North Indiana St., $3,120. Bids Jan. 27, awarded Feb. 11. Noted Jan. 14, C.D.—Jan. 16, E.N.-R.

WELDED STEEL PIPE—Sacramento, Calif.—R. W. Sullivan, secy. Carmichael Irrigation Dist., Box 1427, 2,200 lin.ft. 10 in. 12 gage and 2,000 lin.ft. 12 in. 10 gage welded steel pipe, to Sacramento Pipe Wks., 16th and North B Sts., at 6Sc. and $1.06 per ft. respectively. Bids Jan. 20. Noted Jan. 30, C.D.

†**DRAGLINE EXCAVATORS, etc. — Denver, Colo.**—Bureau Reclamation, Dpt. Interior, Denver, Colo., dragline excavators, power shovels and dragline buckets for Casper-Alcova Project, Wyoming, for Owyhee Project, Oregon-Idaho, and All American Canal System, Boulder Canyon Project, California, Spec. 749-D, Schedule 1, to General Excavator Co., Marion, O., $7,477•••Schedule 2, to Bay City Shovels, Bay City, Mich., $5,450•••Schedules 4 and 6, to Harnischfeger Sales Corp, 4400 West National Ave., Milwaukee, Wis., $9,890. Grand total $22,817. Bids Dec. 5. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

TRUCK BODIES—Bridgeport, Conn.—City, Dpt. P. Purchases, 14 bodies for ash collecting trucks, 14 cu.yd. capacity with automatic hoist and dumping arrangement, to Municipal Sanitation Corp., Tuxis Hill, Fairfield, $30,450. Bids Feb. 14, awarded Feb. 17.

FERRIC CHLORIDE—Chicago, Ill.—Sanitary Dist. of Chicago, 910 South Michigan Ave., 350 tons real ferric chloride in solution, f.o.b. tank cars at Calumet Sewage Treatment Plant, to Grasselli Chemical Co., West 21st and South Peoria St., $12,530. Bids Feb. 6, awarded Feb. 13. Noted Feb. 17, C. D.

PIPE, etc.—Murphysboro, Ill.—Jackson Co., R. S. Hoffman, supt. Hys., 932 ft. 15- to 48-in. c.m. pipe, to Wheeling Corrugating Co., 1,000 Spruce St., St. Louis, Mo., $1,660•••117 and 94 right-of-way markers, to P. Reiman, Murphysboro, at 90c. each•••crusher power unit, elevator and truck mounting, to American Pulverizer Co., 1249 Macklind Ave., St. Louis••• feeder conveyor and storage bin, to Iowa Mfg. Co., Cedar Rapids, Ia., $1,085. Bids Feb. 5. Noted Jan. 29, C.D.

†**BLAST HOLE DRILLING MACHINES, etc.—Eastport, Me.**—U. S. Eng., blast hole drilling machines and bit sharpening equipment in connection with Passamaquoddy Bay Dam and Power Plant Project, to Bucyrus Erie Co., South Milwaukee, Wis., $20,272. Bids Feb. 10, awarded Feb. 17. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

STEEL RAIL — Baltimore, Md. — Western Maryland Ry., Standard Oil Bldg., 1,000 tons steel rail, to Carnegie Illinois Steel Co., Carnegie Bldg., and 1,500 tons, to Bethlehem Steel Co., Bethlehem, Pa.

AIR COMPRESSORS—Boston, Mass.—City, Supply Dpt., D. F. Doherty, supt., two portable air compressors to P. Wks. Dpt., to P. S. Perkins Co., 376 Dorchester Ave., South Boston, $2,050; stationary air compressor to P. Wks. Dpt., to Ingersoll Rand Co. of N.E., 285 Columbus Ave., Boston, $2,000. Bids Jan. 23, awarded Feb. 18. Noted Jan. 20, C. D.

TRUCKS, etc.—Meridian, Miss.—Bd. S[upervs.] Lauderdale Co., two trucks, to Meridian International, Meridian, $2,098•••one truck with dump body, to Canada Motor Co., Meridian, $1,235•••two Adams graders, to Mississippi Road Supply Co., Jackson, $3,288. Grand total $6,621. Road machine and tractor parts, to Mississippi Road Supply Co., Jackson, and Mississippi Tractor & Equipment Co., Meridian, at list prices. Noted Jan. 3, C.D.

STRUCTURAL STEEL, etc.—Missouri—State Hy. Comn., Jefferson City, structural steel for repairing bridge, St. Francois Co., to Superior Structural Steel Co., 5100 Farlin St., St. Louis, $662; 59,200 bd. ft. creosoted lumber for same, to Brown Wood Preserving Co., Inc., 4th and K Sts., Louisville, Ky., $3,251. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

†**PILES—Kansas City, Mo.**—U. S. Eng. Mfg. Exch. Bldg., 750 piles for Missouri River work, to Dougherty Lumber Co., Cottage Grove, Ore., $4,585. Bids Feb. 3. Noted Feb. 10, C. D.

†**STEEL PLATE, etc.—Fort Peck, Mont.**—U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, Mo., 150,000 lb. 18 gage steel plate for Fort Peck Dam, to Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O., $11,985 est. $13,000•••8,540,000 lb. ring beams and splice bars, 3,488,000 lb. purlins and clip angles, 586,000 lb. bolts, to American Bridge Co., 208 South LaSalle St., Chicago, Ill., $355,960 est. $420,000. Bids Feb. 12, awarded Feb. 13. Noted Feb. 4, C.D.—Feb. 6, E.N.-R.

†**PONTONS—Omaha, Neb.**—U. S. Eng. 819 City Natl. Bank Bldg., constructing and delivering 2 steel pontons, to Sanders Boat Yard, 1st and Poppleton Sts., $2,644. Bids Feb. 5, awarded Feb. 12. Noted Dec. 14.

CAST IRON PIPE—Newark, N. J.—Public Service Corp. of New Jersey, 80 Park Pl., 200 tons 4 in. c.i. pipe, to U. S. Pipe & Fdry Co., Burlington. Noted July 24, 1933, C. D.—July 27, E. N.-R.

†**COAL HANDLING EQUIPMENT — West Point, N. Y.**—Con. Q.M., U. S. Military Academy, coal handling equipment, to Nicholson Co., 405 Lexington Ave., New York. Bids Jan. 16.

PIPE, DISTRIBUTORS, etc.—Raleigh, N. C.—Div. Purchase & Contr., to Dixie Culvert & Metal Co., 801 Fayetteville Ave., corrugated metal pipe, about $10,000•••to Carolina Tractor & Equipment Co., 733 West Hargett Ave., two concrete mixers $1,685; two 9x16 portable rock crushers $3,434; two 800 gal. and three 1,000 gal. bituminous distributors $6,564••• to North Carolina Equipment Co., 3116 Hillsboro Ave., 5 tank car heaters $9,515. 1,465 hrs. mineral asphalt plank, $601. Grand total $31,799. Noted Feb. 11. C.D.

PIPE—Bremerton, Wash.—City, 1,500 ft. 12 in., 3,000 ft. 8 in., 1,000 ft. 6 in. and 100 ft. 4 in. c.i. pipe, to H. G. Purcell Co., Colman Bldg., Seattle, $6,283; fittings, to Atlas Foundry, 3012 Wilkeson St., Tacoma, $600.

CAPACITY BREAKERS—Tacoma, Wash.—City Light Dpt., City Hall, seven 69 kv., 500,000 kva. interrupting capacity breakers, to Pacific Electric Mfg. Co., 4th & Pike Sts., Seattle, $43,400. Est. $14,000. Noted Jan. 31, C.D.

CAST IRON PIPE—Yakima, Wash. — City, 300 ft. 18 in. c.i. pipe, to H. G. Purcell, Colman Bldg., Seattle, $858•••1,600 ft. 8 in. and 6,000 ft. 6 in. c.i. pipe, fittings, joining compound, 23 valve boxes, five fire hydrants, three 8 in. and 19 six in. gate valves, to Yakima Hardware Co., 224 South 1st St., $7,050•••constructing irrigation ditch, to J. McAulay, 304 North 16th St., $132. Grand total $8,040. Awarded Feb. 12, A. B. Collins, City Hall, engr.

TRUCK—LaCrosse, Wis.—LaCrosse Co. Hy. Comn., 1-1½ ton trucks, to McKenzie Chevrolet Co., LaCrosse, $825•••2-3 ton International Trucks, to Terminal Service Garage, LaCrosse, $1,926. Bids Feb. 4.

CALCIUM CHLORIDE—Milwaukee, Wis.—Milwaukee Co. Park Comn., calcium chloride, to Schneider Fuel & Supply Co., 3438 Forest Home Ave., $588•••hardware, to J. Pritzloff, 333 North Plankington Ave., $222•••tractor, to Milwaukee Power & Equipment Co., 525 North 22nd St., $903•••trailer, to Drott Tractor Co., Inc., 3841 West Wisconsin Ave., $375•••¾ ton truck, to General Motors, 1326 West Clybourn St., $669•••¾ ton pick-up truck, to King Broeger Co., 1802 West Forest Home Ave., $954••• ¾ ton truck, to Hall Chevrolet Co., Inc., 3209 West North Ave., $694•••1½ ton dump truck, to Venus Motors Sales, 1504 Packard Ave., Cudahy•••2½ ton truck, to Ryan, Inc., 2819 West Dunbar Ave. Bids Feb. 10.

†**CEMENT—Milwaukee, Wis.**—Vet. Administration, 2,000 bbl. cement, to Wilbur Lumber Co., 7919 West National Ave., $2.50 per bbl. Bids Feb. 19, awarded Feb. 19.

†**PUMPS, etc.—Milwaukee, Wis.**—U. S. Forest Service, 283 gasoline pumps, to Phillips Pump & Tank Co., 904 Evans St., Cincinnati, O., $3,148•••106 planting plows, to Hunter Tractor & Mchy. Co., 327 South 16th St., $52,979•••42 towing chains, to International Chain Co., York, Pa., $145•••galvanized wire,

†*Federal Government.*

Materials, etc. (Continued)

to American Auto Electric Sales Co., 1033 Vanburn St., Chicago, Ill., $1,215. Grand total $57,187. Awarded Feb. 11.

REINFORCING STEEL—**Milwaukee, Wis.**—U. S. Eng., 159,182 lb. reinforcing steel, to Worden Allen Co., Port Washington Rd., $2,930. Bids Feb. 5, awarded Feb. 19.

TAR — **Milwaukee, Wis.** — Central Bd. Purchases, furnishing 532,450 gal. more or less tar, to Milwaukee Bituminous Products Co., 110 East Wisconsin Ave., Milwaukee, 12.25c. per gal.; 1,200 tons asphalt filler and cement, to Texas Co., 5061 West State St., at (A) $18.29 per ton (B) $17.79 (C) $23.14 (D) $24.14 and (E) $24.14 per ton. Bids Jan. 30, awarded Feb. 17. Noted Jan. 23, C. D.

PATROL GRADER—**Waukesha, Wis.**—Waukesha Co., power patrol grader, to Wehr Co., Waukesha, $3,936. Bids Feb. 3.

TRUCKS — **Wauwatosa, Wis.** — Bd. Park Comrs., furnishing dump truck, to E. A. Swendson Co., Inc., 6336 West North Ave., $772; ¼ ton pick-up truck, to Raab Motor Co., 3731 West Lisbon Ave., Milwaukee, $420. Bids Feb. 11. Noted Feb. 7, C. D.

FOREIGN

Australia, Brisbane—Apr. 24, by City Electric Light Co. supplying 5,829 ft. of 3 core cable; Apr. 17, for supplying 7 pole type automatic outdoor booster transformers.

Egypt, Cairo—Ministry of Interior taking bids electric equipment, incl. one 260 hp. diesel engine coupled to one 175 kw. d.c. generator, switchboard, cables, for Shebinel Kom Station. Specifications at nearest Egyptian Legation or Consulate.

England—Commell Laird & Co. Ltd., **Birkenhead,** plans plant extension, $600,000•••**Exeter** Municipality voted $625,750 for town hall on Waterbeer St.•••Freyer & Sons, archts., **St. Leonards,** preparing plans housing development, for I. S. D. Hicks, $1,000,000•••I. B. Bowcock, **Hastings,** preparing plans housing development, $750,000•••**Tipton** Urban District Council voted to construct 406 houses, $812,000 •••**Springhead** Urban District Council plans by Taylor, Roberts & Bournan, housing development, $600,000•••**Cannock** Urban District Council making plans 250 houses, $500,000 •••**Bucklow** Rural District Council plans housing development at Mobberley, $600,000••• **Chanctonbury** Rural District Council making plans housing development at Steymouth, $510,-000•••**Dunmow** Rural District Council plans by E. Sandeman & Partners, 15 Victoria St., Westminister, London, constructing 200,000 gal. water tower•••**Dunmow** Rural District Council, J. R. Jones, clk., in market for 236,400 lin.ft. 3- to 6-in. spun iron pipe•••**Southend-on-Sea,** R. H. Dyer, engr., preparing plans sea water filtration plant, aerating, heating, sterilization and circulation plant.

England — Liverpool Housing Comn., **Liverpool,** taking bids constructing 630 houses at Sparrow Hall Estate, $1,300,000•••Sparks & Stephens, Moulderth Rd., Heaton, plans 450 houses, **Mersey,** $987,000•••M. M. Drabble, **Kettering,** plans by Talbot, Brown & Fisher, Burystead Pl., Wellingborough, housing development, $1,000,000•••J. E. Webb & Co., **Dunstable,** plans 400 houses, $910,000•••Stewart & Lloyds, **Corby,** plans 400 houses, $795,000••• E. W. Bastock, 1 Morrna Ave., **Hucknail,** plans 350 houses at Chesterfield, $615,000•••J. W. Vernon & Co. Ltd., **St. Albans,** plans factory, for Ballington Hosiery Co. Ltd., $500,000••• G. W. Matkin, Barclay Bank Chambers, Fawcett St., **Sunderland,** plans factory on Warren St., for Ditchbourne Ltd., $525,000•••First National Warren Bros. Co. Ltd., **Teddington,** constructing film studio, to W. H. Gaze & Son Ltd., High St., Kingston, $500,000, Naylor & Roberts, 19 Hanover Square, West London, archts.•••Bucks Domestic Engineering Co., **Uxbridge,** plans large extensions•••Crystal Glass Co. Ltd., **Wakefield,** plans factory, $600,000•••Taylor, Woodrow Estates Ltd., 10 Grange Parade, **Hayos,** plans 362 houses at Stanmore, $730,000•••Dodge & Reid, archts., 72 High St., **Brantford,** plan housing development, incl. roads, sewers, water systems at Hawke House Estate, $1,500,000 •••G. Ball, **Northwood,** plans 1,500 houses at Ruislip, $4,000,000•••St. Aubyn Estates Ltd., Chapel St., Devonport, plans Garden City Housing Scheme, **Plymouth,** $2,500,000•••Mar. 2, by I. W. Loader Cooper, city clk., **Chichastar,** supplying and installing oil driven 3 ram pumping plant, 75,000 gal. per hr. at 350 feed head, engine to be horizontal type and 300 British hp., F. R. Dinnis, North St., engr.•••F. Oakes, clk., Brierlay Hill Urban Dist. Council, **Brierlay Hill,** taking bids supplying and installing one 3 ram sewer type pump, 22,000 gal. per hr. with electric motor, automatic control gear and all necessary accessories, G. P. Deeley, 13 Church St., Stourbridge, engr.•••Harringay Sports Arena Co. Ltd., **Harringay,** plans by O. Faber, Romney House, Marsham St., London, constructing arena, $550,000•••W. H. Robinson, Springfield, plans hospital addition for Kent County Hospital, **Maidstone,** $895,000••• **Leicester** Municipality constructing 307 houses, to Simms Sons & Cooke Ltd., Nottingham, $520,185•••D. Harvey, **Hull,** plans police headquarters building, $517,500 voted•••Reginald Edmons, 24 Bennets Hill, Birmingham, plans municipal town hall, **Bury,** $805,000•••**London,** G. Wimpey & Co. Ltd., The Grove, Hammersmith West, plans 302 houses at Hayes, $650,-000•••A. B. Bailey, archt., 202 Windsor House, Victoria St., S.W., **London,** plans factory and office building at Waddon•••Windsor & Newton, Rathbone Pl. West, **London,** plans factory at Wealdstone, $500,000•••G. W. DeRhe Philipe, secy. Madras & Southern Mahratta Railway, 25 Buckingham Palace Rd. West, **London,** taking bids year's supply of copper rods, tubes and sheets•••Sentinal Waggon Wks., **London,** plans reconstructing plant, $4,475,000, S. E. Alley, managing dir.•••Metropolitan Water Bd., **London,** voted $350,000 for new laboratory building at Barrow Hill, and purchasing equipment•••Howis & Belcham, archts., Fenchurch St., E.C., **London,** plans 600 houses at Kemsing, $1,300,000•••Henry Dawson & Sons, archts., 20 Ludgate Hill, E.C., **London,** plans housing development at Morden, incl. 2,500 houses, roads, water and sewerage system, $7,000,000••• **London** County Council plans by G. Gilbert-Scott, 7 Grays Inn Sq., W.C., constructing county hall addition, $4,000,000•••J. Burnett, Tate & Love, 1 Montague Pl., **London,** constructing office building, Tothill St., to Holland, Hamelin & Cubbits Ltd., 1 Queens Anne Gate S.W., $1,450,000•••G. V. Meyer & Watson, Hart, Abbey House, Victoria Station S.W., London, constructing 320 flats at Sloane Ave., to Greigs & Son, Ltd., 100 Victoria St., $1,250,000.

England—**Poole** City Clerk, taking bids refuse disposal plant•••**Sheffield** Municipality constructing 376 houses, to W. Malthouse, Ltd., Rosedale Rd., $584,995•••Middlesex County Council, **Shanley,** constructing 2nd unit mental hospital, to J. Laing & Son, Ltd., Mill House West, London, $647,745•••**Newcastle-upon-Tyne** Municipality constructing wharf extension, to Lindsay Parkinson & Co., Ltd., Blackpool, $390,-730•••**Guildford** Municipality, constructing sewage disposal plant, to Watshams Ltd., Windsor House, Victoria St., West London, $590,000•••**Southend-on-Sea** Municipality voted $1,520,000 for hospital at Rochford•••University of Sheffield, **Sheffield,** plans by Lancaster & Lodge, 19 Bedford Square, Bloomsbury W.C. London, constructing addition, $1,000,000••• Manchester Education Committee, **Manchester,** voted $1,250,000 technical college addition••• S. Aschkensay, 131 Portland St., Manchester, plans 250 houses, **Bury,** $525,000•••W. Morris & Bros. Ltd., 7 Hart St., St. Lukes, plans 244 houses, **Southport,** $560,000•••W. Wright, 133 Easthouse Rd., **Berkdale,** plans housing development, $1,000,000•••Bentley Eng. Co., Ltd., **Leicester,** plans factory at New Bridge St.••• **Rotterdam** Municipality plans gas plant, gas holder, and incidental works•••**Wigan** Municipality, gas holder, to R. and J. Dempster, Ltd., Manchester, $100,000•••Preston Breweries, Ltd., **Preston,** plans plant addition•••Williams Butler & Co., Ltd., **Bristol,** plans benzole manufacturing plant, $375,000 and will be in market for equipment•••English Steel Corp., **Sheffield,** plans reconstructing plant, $3,750,000••• D. Brown & Sons, Ltd., **Penistone,** plans steel works, $700,000•••Hetherington & Wilson County Chambers, **Newcastle-upon-Tyne,** plans belting and hose factory for George Angus & Co., Ltd.•••Westminister Film Production Studios, 106 Bishonsgate, London, plans studios, Glasgow Terrace, $600,000, Naylor & Roberts, 19 Hanover Square, London, archts., prospective bidders should file names with architect••• Walter Bridges & Co., 37 Parliament St., S.W. **London,** plans plant for Projectile Engineering Co., Ltd., $600,000•••P. Pratt & Blount, 174 High St., Acton, plans large factory for Metal Mouldings Ltd., Park Royal Rd., **London**••• J. G. Meaden, Temple Chambers, Temple St., E.C., **London,** plans factory St. Leonard Rd., for Light Alloys Ltd., Liverpool•••Gray, Evans & Crossley, 51 North John St., **Liverpool,** plans mill for Foll Agricultural Co-Operative Society, Ltd., $500,000•••W. P. Horsbury, Exchange Bldg., **Liverpool,** plans plant on Brampton Rd., for Automatic Electric Co. Ltd.

England, London — Geoffrey Whitworth preparing plans theatre for National Theatre Committee, $650,000.

England, London—Avery Equipment Ltd. preparing plans factory for manufacturing component parts for aircraft, H. E. Callan, Brooks Grove, Halstead, Kent, pres•••Chinese Purchasing Commission awarded 20,000 steel tiles for Canton-Hangkow R.R. to Colville Ltd.••• Ministry of Transport approves plans for tunnel construction linking South Shields and Tynemouth, $6,500,000•••British Burnah Petroleum Co. Ltd. Southern House, plans developing Yenangyaung oilfields, $1,500,000.

Holland, Amsterdam — Government jointly with Anthony Fokler Company plan aircraft factory, $850,000.

India — Mar. 20, by Director of Contracts, Army Headquarters, **Simla,** supplying 83 tons wire, steel, black annealed, 12 gage and 9 tons hard 6 gage•••W. R. Izat, secy., Bengal & Northern Ry., 237 Gresham House, Old Broad St., E.C., London, England, taking bids 575,820 railway dog spikes, **Bengal**•••Bengal, T. R. Wynne, managing dir. Bengal-Nagpur Ry., 132 Gresham House, Old Broad St., E.C., London, taking bids supplying steel coach and wagon tires; 5,200 steel draw bars; 250 disc centered wire wheels; and for 40 coach and wagon axles, **Bengal**•••E. A. S. Ball, managing dir. South Indian Railway, 91 Petty France, Westminster, S.W. London, England, taking bids year's supply steel tires, **Bengal**•••Howrah Bridge Comn., **Howrah,** plans new bridge, 2,000 lakhs of rupees.

Irish Free State, Dublin—British Oxygen Co. Ltd., and Hammond Lane Co., preparing plans jointly controlled oxygen plant, $1,000,000.

Japan—Japan Electric Industry Co., Tokyo, plans constructing nickel refinery, $500,000 or more. Applied for permit to Japanese Govt., Ministry of Commerce and Industry, Tokyo.

Mexico — Federal Government, Mexico City, constructing 140 mi. road from Matamoros and Victoria, day labor, $2,000,000.

New Zealand—Mar. 17, by Secretary Public Wks., Supplies & Tenders Committee, **Wellington,** supplying portable filter presses•••Apr. 14, by Deputy Director Public Wks. Dpt., **Wellington,** supplying pumping sets for cooling water •••Mar. 27, by City Clerk, **Dunedin,** supplying two 3 phase, 50 cycle, 31,150/6,600 volt transformers and 6,600 and 35,000 switchgear.

Peru, Lima—W. O. Haase, Calle San Jose 375, interested in prices woodworking machinery•••Harten Hnos. Villalta 229, wishes to import electrical appliances and equipment connected with lighting and power; Konrad Linder, Bejarno 250, in market for printing machines and accessories.

Scotland—Jenkins Marr, 16 Bridge St., **Aberdeen,** prepares plans paper mills for Coulter Paper Mills Ltd., $650,000•••N. Beadmore & Co. Ltd., **Glasgow,** prepares plans extending Parkhead Steel Works plant, $700,000.

Scotland — Edinburgh Municipality votes $485,000 constructing People Playhouse, tenders in March•••Caledonian Power Co. Ltd., **Fort William,** preparing plans plant, $250,000••• British Oxygen Co. Ltd., **Fort William,** preparing plans electro-chemical plant, $1,000,000.

Scotland, Glasgow—J. Lawrence, Ltd., prepares plans 567 houses $1,100,000; Glasgow City Clerk taking bids for constructing 836 houses at Household, $1,250,000.

Siam, Bangkok—Royal Siamese Railways in market for 1,540 top plates for bearing springs.

Sweden, Gothenburg — S. K. F. Ballbearing Co., Gothenburg, plans improving plant, 1,000,-000 kroners.

Western Australia, Koolan Island—Brasserts Ltd., London, England, plans expending $1,000,-000 as preliminary expenditure in opening up iron ore deposits at Yampi Sound.

PUBLIC BUILDINGS

PROPOSED WORK

★ **Ark., El Dorado**—City will apply to P.W.A. for loan and grant of $575,000 for municipal light plant.

Calif., Alhambra—Bd. Educ., 3rd and Main Sts., rejected bids Feb. 10, new classroom and auditorium building, library and cafeteria at the Ramona School. $163,360. J. W. Smart, 39 East Main St., archt. M. Erick, 811 West 7th St., Los Angeles, engr. Noted Feb. 6, C. D. —Dec. 19, E. N.-R.

Calif., Riverside—Riverside Co. plans by G. S. Wilson, Mission Inn, Riverside, courthouse addition. $150,000. Supervs. plan application to W.P.A. for funds to finance construction of same.

Colo., Florence—Fremont County Coals, Inc., S. Hahn, secy., considering installing central steam power plant to generate electricity to 12 coal mines south of here. Taking informal figures.

†**Conn., Norwalk**—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans constructing U. S. Post Office, Cross and Wall, Belden Sts. $340,000. Noted Oct. 17, C. D.—Oct. 24, E. N.-R.

Ill., Chicago — University of Chicago plans by Granger & Bollenbacher, 333 North Michigan Ave., constructing auditorium and student center, etc., Units 11 and 12. P.W.A. project.

Ind., Charlottesville—Jackson Twp., W. Oldham, trustee, plans by C. J. Schreiber, 2915 North Pennsylvania St., rebuilding 2 story, basement, brick, stone high school. $150,000. P.W.A. funds applied for.

★ **Ind., Indianapolis**—Bd. School Comrs., 150 North Meridan St., A. B. Good, bus. dir., plans high school, East 10th St. $800,000. Architect not appointed.

★ **Ind., Indianapolis**—Bd. Trustees, J. W. Craven, secy., plans by Robert Frost Daggett, 922 Electric Bldg., Indianapolis, constructing medical center group, West Michigan Ave. $550,000. P.W.A. project.

Me., Bangor—State, Dr. H. C. Hanscom, dir. Dpt. Health & Welfare, Augusta, plans completed by Crowell & Lancaster, 6 State St., hospital buildings, incl. wing for female patients. $240,-000 and nurses home. $102,500. Plans approved and temporarily held up.

Md., Bethesda—Montgomery Co. Bd. Educ., Court House, Rockville, plans by H. W. Cutler, 1108 16th St., Wash., D. C., 2 story, basement school and gymnasium building. Est. $250,000. P.W.A. project. Noted Apr. 11, C. D.—Apr. 18, E. N.-R., under "Rockville."

Me., Machias—State, Washington State Normal School, B. E. Packard, State Supt. Schools, State House, Augusta, C. P. Morrill, chn. Build-

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†*Federal Government.*

Public Buildings (Continued)

ing Comn., Skowhegan, plans rebuilding administration building, Washington State Normal School. Architect not appointed.

Md., Woodside—Montgomery Co. Bd. Educ., Court House, plans completed by H. W. Cutter, 1108 16th Ave. N.W., Wash., D. C., 2 story, basement Brookville Road Junior High School. $150,000.

★ **Massachusetts** — Commonwealth of Massachusetts, Boston, plans following projects for 1936: Dpt. Mental Diseases, Dr. Overholser, comr., State House, Boston, boiler house addition $35,000, and employees' building $150,000, both at Belchertown Hospital, women's building, Westboro Hospital $350,000, central building, Gardner Hospital $85,000, male infirmary building at Monson Hospital $160,000, laundry building and equipment at Worcester Hospital $150,000, infirmary building at Belmont State School $175,000, sprinkler systems at Wrentham School $59,500, at Belmont School $114,200, at Gardner Hospital, no estimated cost; road construction at Belmont School $7,000, landscaping at Waltham Hospital $25,000, steam water and sewer lines at Belchertown Hospital $25,000, sewer beds at Monson State Hospital $45,000, boilers, stokers at Belmont School $6,000, laundry machinery at Monson Hospital $4,000; Dpt. Public Health, Dr. H. D. Chadwick, comr., State House, Boston, ward building at Rutland Sanatorium $270,000, storehouse addition at North Reading Sanatorium $10,500, hospital building alterations at North Reading Sanatorium $2,500, water supply lines at Westfield Sanatorium $12,500; Dpt. Correction, F. T. Dillon, comr., State House, Boston, prison group of buildings at Norfolk Prison $1,500,000, fire prevention, sprinkler systems at Concord Reformatory $11,000, at Charlestown Prison $16,000, watchman's alarm system $15,000, prison yards $10,000, sewer and water lines $20,000, all foregoing at Bridgewater Farm, dormitory equipment at Concord Reformatory $3,000; Dpt. Public Welfare, R. K. Conant, comr., State House, Boston, buildings, storecraft building alterations at Tewksbury Infirmary $9,000, power plant alterations at Westboro School $45,000, ward building at Tewksbury Infirmary $160,000. Total estimate $3,475,200 plus. Legislative action is being awaited on each. Architects or engineers have not been selected.

†Mass., Concord—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 1 story, basement, brick, steel, stone post office, Walden and Hubbard Sts. $70,000. Noted Jan. 10, 1935, C. D.—July 18, 1935, E. N.-R.

Mass., Haverhill—City, Mayor's Office, plans by J. A. Perkins, 45 North Ave., 3 story, brick, steel high school addition. $250,000. Awaiting P.W.A. approval.

†Mass., Ipswich—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans constructing 1 story, basement, brick, steel, stone post office, Market St. $70,000 appropriated.

†Mass., Medford—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 2 story, basement, 140x180 ft., brick, steel, stone, granite post office. $215,000. Noted Dec. 8, 1933, C. D.—Dec. 21, 1933, E. N.-R.

Mass., Natick—Town, Bd. Trustees of Leonard Morse Hospital, Merchants Assoc. Bldg., rejected bids Feb. 6, hospital addition, Stevens, Curtin & Mason, 45 Newbury St., Boston, archts. P.W.A. project. Will readvertise.

Mass., Norfolk—Commonwealth of Massachusetts, Dpt. P. Health, Dr. H. D. Chadwick, comr., State House, Boston, plans by Stevens, Curtin & Mason, 45 Newbury St., Boston, 3 story, basement, brick, steel women's dormitory, concrete found., at Pondville Cancer Hospital. $155,000. $69,750 P.W.A. grant.

†Mass., Plymouth—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 1 story, basement, 56x70 ft., brick, steel, stone post office. $75,000 appropriated.

†Mass., Revere—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 2 story, basement, brick, steel, stone post office, Bway. and Yeamans St. $250,000.

★ **Mich., Jackson**—State of Michigan Prison Bd., Lansing, plans by Bowd & Munson, 409 Wilson Bldg., Lansing, 4 to 6 story, brick, rein.-con., steel storage, plain found., State Prison Grounds. $400,000.

Minn., Keewatin—Village, A. J. Curto, clk., plans remodeling and improving power plant. Foster & Wahlberg, 316 Medical Arts Bldg., Duluth, engrs. Will hold special election soon to vote on project. Will apply for P.W.A. funds.

Minn., Rochester—City, Public Utility Bd., A. J. Lentfer, secy., making plans furnishing, installing 7,500 and 10,000 kw. turbines in power plant. $200,000. Burlingame & Hitchcock, 521 Sexton Bldg., Minneapolis, engrs.

Mo., Kansas City—Bd. Educ. soon takes bids remodeling and constructing trade school addition, 15th and Forest Ave. $300,000. C. A. Smith, 800 Finance Bldg., archt. Noted Aug. 19, C. D.—Aug. 22, E. N.-R.

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†N. J., Lakewood—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing U. S. Post Office. $100,000.

†N. J., Ocean City—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing U. S. Post Office, Ocean Co. $120,000.

†N. J., South Orange—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing U. S. Post Office. $133,000.

★ **N. Y., Albany** — State Dpt. Maintenance, State Office Bldg., plans by W. E. Haugaard, State Office Bldg., constructing garage, near state building. To exceed $500,000. T. F. Farrell, State Office Bldg., engr.

★ **N. Y., Attica**—Dpt. Correction, State Office Bldg., Albany, plans by W. E. Haugaard, State Office Bldg., Albany, constructing cell block and service connections, at Attica State Prison. $800,000. **Maturity in 1936.**

N. Y., Beacon—Dpt. Correction, State Office Bldg., Albany, plans by W. E. Haugaard, State Office Bldg., Albany, constructing power house, equipment and electric generator, at Matteawan State Hospital. $215,000.

N. Y., Brooklyn—Dpt. Sanitation, Municipal Bldg., New York, plans by F. B. McDuffee, Municipal Bldg., New York, constructing section and service building, 67 Amity St. Est. about $40,000 with equipment.

†N. Y., Canajoharie—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans and takes bids in near future for general contract U. S. Post Office. $80,000.

N. Y., Corning—Div. Military & Naval Affairs, Capitol Bldg., Albany, plans completed by W. E. Haugaard, State Office Bldg., Albany, constructing state armory.

N. Y., Coxsackie — Commissioner Correction, State Office Bldg., Albany, withdrew bids to have been opened Feb. 11, constructing staff accommodations for New York State Vocational Institute. Will readvertise. W. E. Haugaard, State Office Bldg., Albany, archt. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

†N. Y., East Rochester—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans constructing U. S. Post Office. $70,000.

N. Y., Elmira—Dpt. Correction, State Office Bldg., Albany, plans by W. E. Haugaard, State Office Bldg., Albany, constructing chapel, library and service connections, at Elmira Reformatory. $378,000.

†N. Y., Fort Edward—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids general contract U. S. Post Office. $66,000. Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

N. Y., Geneseo—Dpt. Educ., State Office Bldg., Albany, plans by W. E. Haugaard, State Office Bldg., Albany, constructing school and office building and service connections, at Geneseo Normal School. $475,000.

N. Y., Goshen — Bd. Supervs. Orange Co., County Welfare Bldg., plans by W. S. Wick, 15 King St., Middletown, constructing county welfare home addition. $204,000.

N. Y., Holland Patent—Central Rural School Dist. 1, revised plans by Kinne & Grank, 7 Hopper St., Utica, constructing grade and high school. $425,500. P.W.A. project. Foundations awarded to Bedford Constr. Co., 1300 Broad St., Utica. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

N. Y., Ithaca — Dpt. Education, Education Bldg., Albany, plans by W. R. Haugaard, State Office Bldg., Albany, constructing laboratory building and service connections, at Veterinary College, Cornell University. $284,000. **Maturity indefinite.**

†N. Y., Long Beach—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office, Riverside Blvd. and Park Ave. Site purchased.

N. Y., Marcy—See "Sewerage and Waste Disposal."

N. Y., Mexico—Union School Dist. 7, plans constructing school, destroyed by fire. To exceed $140,000. Architect and engineer not appointed.

N. Y., Morrisville—Central School Bd. Dist. 1, soon takes bids excavating, grading, sewage disposal system for school. $145,000. P.W.A. project. Bids Feb. 6 rejected. C. W. Clark, 27 North Main St., Cortland, archt. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

N. Y., Oneida—City, Common Council, City Hall, soon takes bids constructing foundations for hospital. Total est. $308,437. P.W.A. project. M. L. and H. A. King, Dennison Bldg., Syracuse, archts.

N. Y., Perry—Village Bd. plans constructing light and power plant. $200,000, incl. equipment. Site not selected and surveys being made. L. C. Reynolds, 387 Castle St., Geneva, engr. Noted Dec. 27, C. D.—Jan. 2, E. N.-R.

N. Y., Potsdam—Dpt. Educ., Education Bldg., Albany, plans by W. E. Haugaard, State Office Bldg., Albany, constructing Potsdam State Normal School Annex. **Maturity 1936.**

†N. Y., Poughkeepsie—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. $111,500.

★ **N. Y., Raybrook**—Dpt. Health, State Office Bldg., Albany, plans by W. E. Haugaard, State Office Bldg., Albany, infirmary building and service connections at State Hospital. $500,000.

★ **N. Y., Solvay**—New York State Fair Exhibit Authority, H. B. Brewster, pres., Dennison Bldg., Syracuse, plans by A. L. Brockway, Clinton Sq. Bldg., constructing horticultural building, $203,338; farm implements and machinery building, $152,227; and pure foods building, $150,000. Total $505,565.

★ **†N. Y., West Point**—Con. Q.M., U. S. Military Academy, plans nearing completion and soon takes bids constructing academic building, extending present gymnasium, artillery quartermaster garage, warehouse, cadet barracks, ordinance and engineering laboratories. $5,324,250.

★ **†N. Y., West Point**—Con. Q.M., soon takes bids constructing 40 sets Junior Officers' Quarters at U. S. Military Academy. $810,000. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

N. Y., Windham — Central School Dist. 1, Towns of Windham, Jewett, Lexington, Ashland and Durham, H. A. Peck, pres. Bd. Educ., Windham, sketches by J. R. White, 109 South State St., Albany, for central school. $275,000. $123,750 P.W.A. grant allotted. Noted Sept. 27, C. D.—Oct. 3, E. N.-R.

N. C., Charlotte—Group of Citizens, D. D. Henderson, chn. of committee, and chamber of Commerce, promoting movement for educational center and auditorium, $250,000-$300,000. W. G. Rogers, Charlotte, archt.

Pa., Arnold—Bd. Educ. plans by Thayer Co., Greer Bldg., New Castle, Senior and Junior High School, incl. classrooms, library, music room, gymnasium with bleacher capacity of 2,500. $270,000.

†S. C., Anderson—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office. $220,000. Site purchased.

Tenn., Winchester—Franklin Co., c/o J. B. Templeton, Judge, bids about Mar. 21, 3 story, 75x100 ft., rein.-con., brick and stone or rein.-con. and stone court house. Est. about $150,000. $100,000 bonds voted. Noted July 15, C.D.—July 18, E.N.-R.

Tex., Galveston—John Sealy Hospital, c/o Dr. E. Randell, plans by R. L. White, 2200 Guadalupe St., Austin, negro patients' hospital. $250,000. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

Tex., Fort Worth—Bd. Educ. plans by P. M. Green, 212 West 7th St., high school, Arlington Heights. To exceed $150,000.

Tex., San Antonio—City and State plans by Planning Bd., c/o J. K. Beretta, pres., Centennial Bldg., National Bank of Commerce Bldg., expending $250,000 state funds for Centennial observation at the "Alamo" Cradle of Texas Liberty

Utah—State Building Comn., Salt Lake City, plans improving heating plants at Utah State Mental Hospital $31,000; at University of Utah, Salt Lake City, $36,700; State Training School, American Fork, $8,300; State School for Deaf $6,100 and State Industrial School $36,000, both at Ogden***Snow Junior College, Ephraim $1,150; and State Agricultural College, Logan, $21,500. Total $150,000. $71,325 allotted by P.W.A. R. K. Brown, Salt Lake City, engr.

S. C., Columbia—Mar. 12, by Lafaye & Lafaye, archts., 1226 Sumter St., 2 story, basement 200 x 380 ft. brick psychopathic building, Bull St., for South Carolina State Hospital for Insane, Dr. C. F. Williams, supt. $300,000. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

Va., Clarendon—Bd. Educ. plans constructing high school. $175,000. Architect not appointed.

†Vt., Woodstock—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 1 story, basement, 50x75 ft., brick, steel, stone post office, Central St. $75,000.

†Washington and Oregon—U. S. Lighthouse Service, Dpt. Commerce, Wash., D. C., plans constructing light station at New Dungeness, Wash., $12,500; marking newly dredged channel at Baker City, $5,000; automatic lights and signals in Puget Sound, $11,500; beacon light at Patos Island, Wash., $8,500; repairing light station and buoys damaged by storm at Grays Harbor Light Station, $10,000. Total $72,000 allotted.

†Wash., Spokane—Treas. Dpt. at office Sup. Archt., Wash., D. C., withdrew bids to have been opened Feb. 25, constructing elevator plant in Havermale Station U. S. Post Office. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

★ **Wash., Tacoma**—College of Puget Sound, Dr. E. E. Tood, pres., to raise funds for women's and men's dormitories, library, observatory and science building, on campus. $1,000,000.

Wash., Willapa Harbor—City plans 1 story, 160x240 ft. oyster cannery, also wharf supported by chemically-treated piling. $150,000. Plans for electrical work and equipment by G. N. Barker & Assoc., Textile Tower, Seattle. F. J. Rogers, Textile Tower, Seattle.

★ **†T. H., Hicham Field**—Con. Q.M. soon takes bids constructing magazine building, boathouse, radio building, hangars, operation utilities, etc., at Hicham Field. Est. $4,525,750.

†Federal Government.

Public Buildings (Continued)

Canada—Dominion Govt., Dpt. P. Wks., Ottawa, Ont., estimates for the fiscal year ending Mar. 31, 1937, plans public building, Bedford, Que. $26,000, additional amount required for postal terminal building, Montreal, Que. $250,000 entomological building, Belleville, Ont. $36,500 public building, Fort Erie, Ont. $72,000, addition to armory, Hamilton, Ont. $30,000, R.S.A. and brigade building, Kingston, Ont. $55,000, public building, Kirkland Lake, Ont. $75,500, public building, Richmond Hill, Ont. $29,500, public building, Watford, Ont. $14,000, public building, Russell, Man. $23,500, public building, Kindersley, Sask. $32,000, public building, Peace River, Alta. $31,500, public building, Hollyburn, B. C. $37,000, public building, Penticton, B. C. $65,000, public building, Salmon Arm, B. C. $23,500, public building, Sidney, B. C. $24,000, replacements, repairs and improvements at Experimental Farms, B. C. $100,000, post office equipment $14,000, repairs, improvements and alterations at Military Hospitals, $80,000, alterations and repairs to Dominion Public Buildings of Maritime Provinces generally $50,000, Quebec $100,000, Ontario $125,000, Manitoba $25,000, Saskatchewan $25,000, Alberta $17,000, British Columbia $35,000, cut stone, etc., National Monument on Connaught Place, Ottawa, Ont. $100,000.

Ont., Ottawa — University of Ottawa, G. Marchand, rector, Laurier Ave. E., soon takes bids constructing dormitory, (1st unit) of new university buildings, Mann Ave. $100,000. Total est. $300,000.

BIDS ASKED

†**Ala., Fort McClellan**—Mar. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing building, kitchen ventilation, plumbing, electrical work, etc.

†**Calif., Colton**—Mar. 11, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing betterments, incl. pipe railings, concrete curbs, etc., in U. S. Post Office.

★ **Calif., San Francisco**—Mar. 10, by State Div. Architecture, P. Wks. Bldg., Sacramento, 1 story, steel, concrete livestock pavilion, Visitacion Valley Dist., separate bids wanted for (1) work complete (2) segregated general work (3) mechanical equipment (4) electric work (5) fabrication of structural steel (6) erection of structural steel (7) stadium seats. Total est. $650,000. W. D. Peugh, 333 Montgomery St., archt.

Conn., Bridgeport—See "Contracts Awarded."

Conn., Storrs—Mar. 3, by State, Connecticut State College, Storrs, office of Comptroller, installing 1,417 new light outlets in 35 residential buildings with 7 new services, etc., installing electric light wiring in 4 farm buildings, installing light and power wiring mechanics arts building. H. B. Zelm, 11 Asylum St., Hartford, engr.

Conn., West Hartford (br. Hartford)—Mar. 2, by Town, R. L. Loomis, mgr., furnishing, installing automatic passenger elevator in new town hall. Bids from elevator manufacturers who manufacture in their own plant at least 85% of all elevator equipment to be furnished and who guarantee to maintain and Hartford 24 hour service. Ebbets & Frid, 15 Lewis St., Hartford, engr.

Ga., Atlanta—See "Contracts Awarded."

★ **Ill., Springfield**—Mar. 3, by C. H. Hammond, superv. archt. Div. Architecture & Engineering, Dpt. P. Wks. & Buildings, Centennial Bldg., Springfield, general contract heating, plumbing, ventilating, elevator, pipe covering, electrical work for armory and office building, $1,000,000; and general work, substructure, archives building, $500,000. P.W.A. project.

†**Ind., Delphi**—Mar. 17 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

†**Mass., Boston**—See "Contracts Awarded."

†**Mich., Alma** — Treas. Dpt. at office Supt. Archt., Wash., D. C., bids about Mar. 1 on revised plans constructing 1 story, basement, brick, stone U. S. Post Office. $69,000. Frank & Spence, Saginaw, archts.

Mo., Excelsior—Mar. 11, by City, general contract 3 story, basement office and baths, 700,000 cu.ft. floor space. $150,000. P.W.A. project. Thompson & Lichtner Co., 205 West Wacker Dr., Chicago, Ill., engrs. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

Mo., Nevada—Mar. 11, by State Hospital 3, Nevada, and Bi-Partisan Advisory Bd., State Building Comn., E. M. Eagan, executive secy., Jefferson City, constructing power plant. P.W.A. project. Black & Veatch, 4706 Bway., Kansas City, engrs.

Mo., St. Louis—Mar. 24, by City, Bd. P. Service, City Hall, equipment for main kitchen, cafeteria, metabolic diet kitchen, ward diet kitchen, bakery equipment, ward dish washing equipment, electrical work, plumbing, steam piping, brine piping for Homer G. Phillips City Hospital for Colored, on Whittier St. between St. Ferdinand and Kennerly Aves. W. C. E. Becker, city engr.

★ **N. H., Nashua**—Mar. 10, by City, I. D. Ravenelle, city clk., E. T. Tracey, supt. schools, City Hall, for Senior High School, 3 story, basement, 58x320 ft. front, 58x110 ft. rear, two wings, 75x140 ft. and 75x110 ft., brick, steel, stone, granite, $600,000. Wells, Hudson & Granger, Main St., Hanover, archts. R. D. Kimball Co., 6 Beacon St., Boston, engrs. Noted Dec. 18, C. D.

N. Y., Albion—Mar. 26 (extended date), by Dpt. Correction, State Office Bldg., Albany, constructing miscellaneous work at Albion State Training School. W. E. Haugaard, State Office Bldg., Albany, archt. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

N. Y., Attica—Mar. 26, by Dpt. Correction, State Office Bldg., Albany, construction, heating, sanitary and electrical work for cell block at Attica State Prison. To exceed $150,000. Noted Feb. 19, C. D.

N. Y., Beacon — Mar. 26, by Dpt. Mental Hygiene, State Office Bldg., Albany, heating, electric and refrigerating work for kitchen, dining room and bakery, Main Group, Matteawan State Hospital.

N. Y., Brooklyn—Mar. 4, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. Extension and Concord St., plumbing, drainage, heating, ventilating, electrical work and lighting fixtures for P. S. 207, Fillmore Ave., between Kimball and Coleman Sts., for Bd. Educ., 500 Park Ave., New York.

N. Y., Buffalo—Mar. 6, by Adjutant General, Div. Military & Naval Affairs, State Capitol Bldg., Albany, heating work State Cavalry Armory.

★ †**N. Y., Canadaigua**—Mar. 31, by U. S. Veterans Administration, Arlington Bldg., Wash., D. C., constructing hospital buildings at U. S. Veterans Hospital. $1,200,000. Noted Aug. 28, C.D.—Sept. 5, E.N.-R.

N. Y., Clymer—Mar. 16, by Bd. Educ., general contract plumbing, heating, electrical work for school. $148,000. P.W.A. project. R. A. Freeburg, 1105 West 3rd St., Jamestown, archt. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

N. Y., Creedmor—Mar. 25, by Dpt. Mental Hygiene, State Office Bldg., Albany, construction, heating, sanitary work, special electric fixtures, electric elevators for patients and employees, at Creedmor State Hospital. To exceed $200,000.

N. Y., Elmira—Dpt. Correction, State Office Bldg., Albany, bids about Apr. 1, constructing administration building, at Elmira Reformatory. $300,000. W. E. Haugaard, State Office Bldg., Albany, archt. Noted Sept. 25, C. D.—Oct. 3, E. N.-R.

N. Y., Glens Falls—Mar. 10, by Union Free School Dist. 18, constructing school. Tooker & Marsh, 101 Park Ave., New York, archts. E. E. Seelye & Co., 101 Park Ave., New York, engrs. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

N. Y., Hamburg—Mar. 9, by Bd. Educ., general contract heating, plumbing, electrical work for school. P.W.A. project. Bley & Lyman, 505 Delaware Ave., Buffalo, archts. Foundation awarded to A. K. Van Ingen, Lake View Ave. Bids Dec. 3. Noted Dec. 11, C. D.

N. Y., Kendall—Mar. 20, by Central School Bd., general contract plumbing, heating, electrical work for school. $220,000. P.W.A. project. Bley & Lyman, 505 Delaware Ave., Buffalo, archts. Noted Dec. 2, C. D.—Dec. 5, E. N.-R.

N. Y., Limestone — Mar. 12, by Union Free School Dist. 1, general contract plumbing, heating and electrical work for school. $135,000. P.W.A. project. R. A. Freeburg, 1105 West 3rd St., Jamestown, archt. Foundation awarded to Custer Eng. Co., Terminal Bldg., Bradford, Pa. Noted Dec. 11, C. D.

†**N. Y., Mount Vernon**—Mar. 11, by Treas. Dpt. at office Sup. Archt., Wash., D. C., completing extension and remodeling U. S. Post Office.

N. Y., New York—See "Contracts Awarded."

†**N. Y., New York**—Mar. 9, by Treas. Dpt. at office Sup. Archt., Wash., D. C., battery charging apparatus (new partitions, etc.), in U. S. Parcel Post Building.

N. Y., North Collins—Mar. 16, by Bd. Educ., general contract plumbing, heating and electrical work for school, Church St. $185,000. P.W.A. project. Bley & Lyman, 505 Delaware Ave., Buffalo, archt. Noted Dec. 2, C. D.—Dec. 5, E. N.-R.

N. Y., Orangeburg—Mar. 24, by Dpt. Mental Hygiene, State Office Bldg., Albany, construction, heating, sanitary, electrical work, electric elevators and dumbwaiters, tunnels, connecting corridors, for addition to power plant at Rockland State Hospital. $200,000.

★ **N. Y., Riverhead**—Mar. 9, by Bd. Educ. Union Free School Dist., general contract high school and installing plumbing, heating and electrical equipment. $644,000. W. I. LeFon, Jr., Southampton, archt. Noted Dec. 30, C. D.—Nov. 7, E. N.-R.

†**N. Y., Rochester**—Mar. 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., general contract federal building. $100,000.

N. Y., Steuben—Mar. 20, by Dpt. Conservation, State Office Bldg., Albany, construction work for Baron von Steuben's Cabin, Steuben Memorial Park, Oneida Co.

N. Y., Syracuse—Mar. 31, by Dpt. Agriculture & Markets, State Office Bldg., Albany, construction, heating, sanitary and electrical work and special electric fixtures for additions to Women's Building at Syracuse State Fair Grounds. To exceed $150,000.

N. Y., Troupsburg—Mar. 14, by Bd. Educ., general contract plumbing, heating, electrical work for school. $145,000. P.W.A. project. Raymond A. Freeburg, 1105 West 3rd St., Jamestown, archt. Noted Dec. 27, C. D.—Jan. 2, E. N.-R.

N. Y., Utica—Bd. Educ., 13 Elizabeth St., bids about Mar. 15, constructing superstructure high school. $353,000. P.W.A. project. Goube & Ames, 70 Genesee St., archts. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

N. Y., Warwick—Mar. 5, by Dpt. Social Welfare, State Office Bldg., Albany, constructing miscellaneous work at State Training School. W. E. Haugaard, Albany, state archt.

N. C., Rocky Mount—Mar. 19, by T. W. Coleman, mayor, and Bd. Alderman, boiler plant equipment, incl. 1 horizontal cross drum, forged steel, sectional header tube water boiler, approximately 1,050 hp, completes with superheater, soot blowers, side and rear water walls and equipment. Boiler to be constructed for 450 lb. operating pressure and superheater for delivery of steam at maximum temperature of 750 degrees Fahrenheit. One brick setting for boiler specified, one nine retort underfeed stoker, complete with clinker grinder, ash hopper, combustion control and specified appurtenant equipment. W. C. Olsen, Rocky Mount, consult. engr.

†**N. C., Wilmington**—Mar. 5, by Treas. Dpt. at office Sup. Archt., Wash., D. C., freight elevator in U. S. Post Office.

†**Okla., Blackwell**—Mar. 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing, extending and remodeling U. S. Post Office. $65,000.

†**Tenn., Memphis**—Mar. 10, by P. Wks. Administration, Div. Housing, Wash., D. C., foundations of Dixie Homes Housing Project, H-3401. Noted Feb. 14, C.D.—Feb. 20, E.N.-R.

†**Tex., Fort Worth**—Mar. 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., installing complete elevator plant in Clinical Ward Building 2, Maximum Custody Ward Building 3, and Kitchen Building 6, U. S. Narcotic Farm.

Tex., Fort Worth—Mar. 6, by Bd. Educ., P. Williams, bus. mgr., 409 East Weatherford St., for Senior High School, 3 story, basement, 129x341 ft., brick, steel, rein.-con., plain found., Arlington Heights. $300,000. P. M. Geren, 407 Bewley Bldg., archt.

Tex., Fort Worth—Mar. 10, by City, c/o G. D. Fairtrace, mayor, 1 story, 218x405 ft., rein.-con., brick Texas Centennial coliseum building, plain found., Camp Bowie Blvd., $308,000. W. C. Hedrick, Inc., 1005 1st Natl. Bank Bldg., and E. G. Withers Architectural Co., Holmes Bldg., archts.

†**Va., Suffolk** — Mar. 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., repairing U. S. Post Office.

†**W. Va., Bluefield**—Mar. 16, by Treas. Dpt. at office Sup. Archt., Wash., D. C., air conditioning and altering U. S. Post Office and Court House. $33,000.

†**Wash., Bremerton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids about Mar. 1 constructing U. S. Post Office, 6th and Pacific St. $111,000.

†**Canal Zone**—Mar. 31, by Con. Q.M., Panama Canal, Balboa Heights, C. Z., constructing auditorium building at Christobal; quarters for lock guards at Gatun, incl. 1 barrack building and officers' quarters; quarters for lock guards at Pedro Miguel incl. 1 barrack building and officers' quarters; 1 storage shed and barrack building and officers' quarters at Miraflores; 1 gas production plant at Balboa; 2 Ward Buildings 18 and 19, at Leper Colony, at Palo Seco and one Ward Building 19.

†**T. H., Pearl Harbor**—Mar. 11, by Public Wks. Officer, Pearl Harbor, constructing quarters at Fleet Air Base, Spec. 8113, for Yards & Docks, Navy Dpt., Wash., D. C.

CONTRACTS AWARDED

★ †**Ark., Little Rock**—Veterans Administration, Wash., D. C., general contract additional buildings and utilities to McGregor & Pickett, Little Rock, $646,000•••plumbing, heating and electrical work to C. A. Hooper, Madison, Wis., $237,000•••elevators to A. Kieckhefer Elevator Co., 1100 West St. Paul St., Milwaukee, Wis., $17,729. Grand total, $900,729. Noted Nov. 4 C.D.—Nov. 7, E. N.-R.

†**Calif., Benicia**—Con. Q. M., repairing East Wall and roof of Warehouse 71, at Benicia Arsenal, to A. Nelson, 242 Ocean Ave., San Francisco, $5,645. Bids Feb. 6, awarded Feb. 12. Noted Feb. 14, C. D.

Calif., Glendale—Bd. Educ., 411 East Wilson St., constructing new Junior College plant, containing administration building, science building, 2 locker buildings, etc., 1500 North Verdugo Rd., to Whittaker and Snook, 40 South Los Robles St., Pasadena, $299,945. Bids Feb. 11, awarded Feb. 13. Noted Jan. 30, C. D.

†**Calif., Lodi**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plumbing for post office, to Scott Co., 243 Minna St.•••electrical work, to Collins Electric Co., Stockton•••painting, to Ecker Painting Co., Stockton•••reinforcing steel, to Soule Steel Co., 1750 Army St., San Francisco•••structural steel, to Judson Pacific Co., 609 Mission St., San Francisco. Noted Nov. 26, C. D.—Dec. 5, E. N.-R.

Calif., Long Beach—City, general contracts memorial building, Cedar Ave. and Broadway, to J. K. Thomas, 700 Kress Bldg., $196,722 •••ventilating, steam heating, to O. E. Ross.

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†*Federal Government.*

Public Buildings (Continued)

1850 Pacific Ave., $25,550***plumbing, to Huckman, 471 8th St., San Pedro, $9,969*** electrical work, to Coast Electrical Co., 2350 Cedar Ave., $13,800. Grand total $246,041. Bids Feb. 10, awarded Feb. 13. **P.W.A.** Noted Feb. 5, C. D.—Oct. 10, E. N.-R.

Calif., Los Angeles—Bd. Educ., Chamber of Commerce Bldg., reconstructing, rehabilitation, strengthening Shop 1, John E. Fremont School, 7676 South San Pedro St., to H. F. Miller, 1908 West 75th St., $22,545***main brick building at 10th St. School, 1000 Grattan St., to P. P. Shelby, 111 West 7th St., $51,234*** main brick building at Belvedere Elementary School, 3724 East 1st St., to Pacific Realty & Building Co., 433 East Broadway, Long Beach, $87,570. Grand total $161,349. **P.W.A.** Bids Feb. 7 and Jan. 30, awarded Feb. 15. Noted Feb. 3, C. D.

★**Calif., Sacramento**—State Div. Architecture, P. Wks. Bldg., general contract 4 story, rein.-con. office building, to Barrett & Hilp, 918 Harrison St., San Francisco, $345,983***plumbing, to M. R. Carpenter, 907 Front St., Sacramento, $21,270***heating and ventilating, to Luppen & Hawley, 3126 "J" St., Sacramento, $78,322***electrical work, to Coast Electric Co., 2350 Cedar Ave., Long Beach, $31,572***elevators and dumbwaiters, to Otis Elevator Co., 1 Beach St., San Francisco, $45,835. Grand total $522,982. Bids Feb. 11, awarded Feb. 17. Noted Feb. 20, C.D.—Jan. 23, E.N.-R.

Calif., Salinas — Supervs. Monterey Co., 3 story, rein.-con. court house, to Barrett & Hilp, 918 Harrison St., San Francisco, $467,428. Bids Feb. 15. Noted Feb. 13, C. D.—Jan. 23, E. N.-R.

Conn., Bridgeport — City, Public Purchases Dpt., 172 State St., painting, decorating, boilers, steamfitting etc., at Warren Harding, Central High, Nathan Hale, Madison, Island Brook, Sheriden, Bassick, Bryant, Whittier, Read, Hall, Trade, Hallen, Edison, Barnum, Staples, Jefferson, Washington, Black Rock, Congress, Wheeler, McKinley, Shelton, Maplewood Elementary, Maplewood Junior High, Maplewood Annex, Elias Howe, Longfellow, Jackson, Columbus, Webster and Beardsley Schools. **W.P.A.** labor, $236,956. Dpt. Purchases buys materials. W. P. Kirk, director of Maintenance. T. J. Ryan, W.P.A. engr.

†Conn., Bristol—Tremaglio Bros., general contractors, Waterbury, Conn., heating for U. S. Post Office, Malone Court, for U. S. Treas. Dpt. at office Sup. Archt., Wash., D. C., to C. N. Flagg & Co., 79 Griswold St., Meriden***reinforcing steel, to Sweet's Steel Co., Williamsport, Pa.***iron, to Ornamental Iron Wks., Sweetzer Ave., Akron, O.***structural steel, to Bethlehem Fabricators, Inc., 8th and Lehigh Sts., Bethlehem, Pa.***electrical work, to A. C. Senecal Co., P. O. Box 35, Westfield, Mass. Noted Jan. 3, C. D.—Jan. 9, E. N.-R. under "Contracts Awarded."

Conn., East Haven (br. New Haven)—Town, J. H. Corbett, chn. Building Comn., 78 Main St., general contract brick, steel, stone school, Tyler and Taylor Sts., to Fusco-Amatruda Co., 59 Amity Rd., New Haven, $253,800***plumbing and heating, to Ideal Plumbing & Heating Co., 208 Meadow St., New Haven, $23,550 and $31,325 respectively***electrical work, to M. B. Foster Electric Co., 153 Court St., New Haven, $25,890. Grand total $334,565. **P.W.A.** Bids Jan. 30, awarded Feb. 11. Noted Feb. 13, C. D.—Dec. 26, E. N.-R.

Conn., Middlebury—Allyn Wadhams Co., general contractors, 15 Lewis St., Hartford, heating and plumbing for town hall, to H. Lyttle, Frost Rd., for Town, H. E. Bronson, Town Hall, engr.***limestone, to Ingalls Stone Co., Bedford, Ind.***granite, to Providence Granite Co., 210 Kinsley St.***reinforcing steel, to Topper & Griggs, 200 North Main St., West Hartford Ave., Hartford***structural steel, to Standard Structural Steel Co., 1014 Wethersfield St.***ornamental iron, to Builders Iron Co., 67 Winthrop Ave., New Haven***sheet metal, to D. L. Juckett, 40 Allendale Rd., Hartford***electrical work, to Waterbury Electric Repair & Eng. Co., 127 East Main St.***millwork, to C. H. Dresser & Son, 297 Sheldon St., Hartford. Noted Feb. 13, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

†D. C., Wash.—Treas. Dpt. at office Sup. Archt., Wash., D. C., altering high pressure steam service at central heating plant, to S. E. Dockstader, 305 Munsey Bldg., $7,590.

†D. C., Wash. — Treas. Dpt. at office Sup. Archt., Wash., D. C., folding doors, rolling steel curtains, bronze gates at U. S. Post Office, to Harwood-Nebel Constr. Co., Inc., 2539 Penn Ave. N.W., $11,000.

†D. C., Wash.—Dpt. Interior, Wash., D. C., wells and pumping unit at St. Elizabeth's Hospital, Congress Heights, to Layne Atlantic Co., Norfolk, Va. Est. $28,200. Bids Dec. 14.

Ga., Atlanta—Georgia School of Technology, c/o M. L. Brittain, pres., 3 story, basement, brick, stone chemistry building addition, day labor. Bush-Brown & Gailey, c/o owner, archts.

Ill., Elgin—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, general contract diagnostic building at Elgin State Hospital, to A. Smith & Co., 134 North LaSalle St., Chicago, $255,700

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plumbing, to O'Callaghan Bros., 21 South Green St., Chicago, $35,800heating and pipe covering, to Gallaher & Speck, 546 Harrison St., Chicago, $33,988 and $6,750 respectively. Grand total $332,238. **P.W.A.** Bids Jan. 14. Noted Jan. 24, C. D.—Jan. 9, E. N.-R.

Ill., Elgin—Dpt. P. Wks. & Buildings, Div. Architecture, Springfield, heating, steam and return mains at Infirmary Buildings 1 and 2, at Elgin State Hospital, to Gallaher & Speck, 546 West Harrison St., Chicago, $19,314***heating for tuberculosis building, to Mid-States Industrial Corp., 3401 11th St., Rockford, $11,459 ***plumbing, to H. P. Reger Co., 1501 East 72nd Pl., Chicago, $15,188***refrigerating equipment, to Westinghouse Electric Supply Co., 228 North LaSalle St., Chicago, $2,140***electrical work, to White City Electric Co., 569 West Van Buren St., Chicago, $11,777***pipe covering for heating system and pipe covering for plumbing, to Standard Asbestos Mfg. Co., 226 West Lake St., Chicago, $2,700 and $1,750 respectively. Grand total $64,328. **P.W.A.** Bids Jan. 14. Noted Jan. 7, C. D.—Jan. 9. E. N.-R.

Ill., Kankakee — Dpt. P. Wks. & Buildings, Div. Hys., Springfield, plumbing for Kankakee State Hospital Diagnostic Building, to Carson Payson Co., Danville, $35,672***heating, to Gallaher & Speck, 546 Harrison St., Chicago, $33,988***pipe covering, to Mid-States Industrial Corp., Rockfort, $4,839***sterilizing equipment, to American Sterilizer Co., 12th and Plum Sts., Erie, Pa., $4,155***refrigerating equipment, to Westinghouse Electric Supply Co., 228 North LaSalle St., Chicago, $2,952. Grand total $82,600. **P.W.A.** Bids Dec. 20. Noted Dec. 19, C. D.

Ill., Manteno — Dpt. P. Wks. & Buildings, Div. Architecture, Springfield, general contract assembly hall, Manteno State Hospital, to Patrick Warren Constr. Co., 226 North LaSalle St., Chicago, $153,000***electrical work, to Divane Bros., 3826 Van Buren St., Chicago, $21,470***pipe covering, to Illinois Philip Carey Co., 2100 West Fullerton Ave., Chicago, $1,350***plumbing, to Klein & Hockman, Dixon, $9,598***heating, to Carson Payson Co., Danville, $14,593. Grand total $200,011. **P.W.A.** Bids Dec. 30. Noted Dec. 19, C. D.

Ky., Louisville — D. X. Murphy & Bro., archts., Louisville Trust Bldg., additional wing to hospital, for City, City Hall, to J. F. Russell & Co., Jackson and Burnett Sts., $347,000. **P.W.A.** Noted Feb. 3, C. D.—Oct. 11, 1934, E. N.-R.

Me., Skowhegan—Googins & Clark, general contractors, 46 Portland St., Portland, structural steel and iron for additions to maternity hospital, to Mequier & Jones Co., Pearl St., Portland, for State Dpt. Health & Welfare, State House, Augusta***ornamental iron, to Hussey Mfg. Co., North Berwick***granite, to J. F. Murphy Co., 6 Bates St., Lewiston***plumbing, to E. N. Cunningham Co., 364 Cumberland Ave., Portland***heating, to A. J. Thayer Co., Spring St. Ext., Auburn***electrical work, to A. C. Senecal Co., Mill St., Westboro, Mass.***roofing and sheet metal, to Hannell Bros., 56 Main St., Lewiston***millwork, to L. W. Webster Corp., Randolph, Vt.***plastering, to Loftus & Son, 6 Barnes Ave., Worcester, Mass.***painting, to O. R. Main Co., 45 Portland St., Portland*** tile and terrazzo, to Zani Tile & Marble Co., Inc., 43 Auburn St., Chelsea, Mass. Noted Dec. 11, C.D.—Dec. 19, E.N.-R., under "Contracts Awarded."

Mass., Abington—Parkman Realty Co., Inc., and Rich Bros., general contractors, 27 School St., Boston, cast stone for high school, to Eastern Cement Stone Co., Lynn St., Malden, for Town, D. D. Wyman, chn. Building Comn., Town Hall***dampproofing and caulking, to Travers Sandell, Inc., 238 Main St., Cambridge***electrical work, to James Wilkinson & Co., 128 Oliver St., Boston***heating and ventilating, to Power Heating & Ventilating Co., Inc., 263 Harrison Ave., Boston***light iron work, to Babcock Davis Corp., 474 Dorchester Ave. S., Boston***painting, to Russell E. McCassey, 54 Playstead Rd., Newton***plaster and lathing, to Micheli Terenzio & Co., 41 Bailey Rd., Arlington***plumbing, to Hobart-Farrell Plumbing & Heating Co., Inc., 26 Court St., Brockton*** roofing, to Providence Cornice Co., 309 Canal St., Providence, R. I.***slate, tile, etc., to Albre Marble & Tile Co., Inc., 64 Mt. Vernon St., Dorchester***sprinklers, to Rockwood Sprinkler Co., 141 Milk St., Boston***structural steel, to West End Iron Wks., 263 Columbia St., Cambridge***steel erection structural steel and reinforcing steel, to R. Di Camillo, 52 Pine St., Swampscott. Noted Jan. 14, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

†Mass., Boston—Con. Q.M., Army Base, repairing warehouses, repair shops, depot and amplification of electric heating, water supply and drainage system, day labor, W.P.A. allotted $146,520 funds.

Mass., Medford—City, J. J. Irvin, mayor, City Hall, 3 story, basement, 58x180 ft., 60x70 ft. wing, brick, steel, limestone city office building, concrete found., Salem St., to M. S. Kelliher Co., 38 Chauncy St., Boston, $459,728. **P.W.A.** Bids Feb. 10, awarded Feb. 14. Noted Feb. 19, C.D.—Jan. 16, E.N.-R.

Mass, Montague—Geo. H. Reed & Co., Inc., general contractors, 24 Franklin St., Greenfield, heating for high school and gymnasium, to J. B. Kennedy, Newton Place, Greenfield, for Town

plumbing, to R. E. Davies & Sons, 19 Market St., Northamptonstone, to Architectural Stone Co., Ave. A, Turners Falls***reinforcing steel, to Truscon Steel Co., 38 Chauncy St., Boston***structural steel, to Haarman Steel Co., Ducharme St., Holyoke***roofing and sheet metal work, to Hampden Cornice Wks., 300 Birmie Ave., Springfield***hardware, to B. Hunter Co., 60 Summer St., Boston. Noted Jan. 9, C.D.—Jan. 16, E.N.-R., under "Contracts Awarded."

Mass., Springfield—City, Commission on City Property, Municipal Bldg., general contract 2 story, basement, brick, steel, cast stone, [illegible] addition to Forest Park Jr. High School, reinforced concrete found., to W. A. Newton Co., Mill River Lane, $143,800***heating and ventilating, to Fred C. McClean, Inc., 47 Park St., $34,0[illegible]*** plumbing, to W. J. Hyland Mfg. Co., 151 Dwight St., $9,957***electrical work, to J. A. Fitzgerald, 51 Dexter St., $7,785. Grand total $195,484. **P.W.A.** Bids Dec. 5, awarded about Feb. 10. Noted Jan. 13, C. D. — Jan. 16, E. N.-R.

Minn., Benson — City, furnishing, installing oil engine generating unit, auxiliary equipment at municipal heating and generating plant, to Fairbanks Morse & Co., 220 East 5th St., St. Paul, about $40,000. Bids Feb. 20. Noted Jan. 29, C. D.

Miss., Greenwood—City, furnishing, installing 3,500 kw. turbine generator unit in light and water plant; furnishing, installing surface condenser and condenser pumps for light plant, to Westinghouse Electric Mfg. Co., Masonic Temple, New Orleans, La., $75,755 and $16,775 respectively. Noted June 20, C. D.—June 27, E. N.-R.

Minn., International Falls—Bd. Educ., general contract 3 story, basement, 116x189 ft., rein.-con. brick school, to Dauplaise & Killeen, 1716 Winter St., Superior, Wis., $257,570*** plumbing and ventilating, to Healy Plumbing & Heating Co., 1954 University Ave., St. Paul, $41,270***wiring, to Universal Electric Constr. Co., 109 South St., Minneapolis, $16,832*** temperature control, to Johnson Service Co., 922 2nd Ave. S., Minneapolis, $4,745. Grand total $320,417. **P.W.A.** Bids Feb. 7. Noted Jan. 23, C. D.—Jan. 30, E. N.-R.

Missouri—State Bi-Partisan Advisory Bd., State Building Comn., E. M. Eagan, executive secy., State Capitol, Jefferson City, installing boilers at State Hospital No. 1, Marshall; at State Hospital 3, Nevada, and at Missouri State School, Marshall, to Erie City Iron Wks., Syndicate Trust Bldg., St. Louis, $67,773; installing stokers at same buildings, to Illinois Stoker Co., Alton, Ill., $40,504. **P.W.A.**

Mo., Columbia—University of Missouri, L. Cowan, secy. Bd. Curators, Jesse Hall, Columbia, to J. L. Crum, Columbia, plumbing for Student Health Center, $12,345; plumbing for Education Building, $14,520; steam line to east campus greenhouses, $4,500***to Richardson Electric Co., 921 North 12th Blvd., St. Louis, electric wiring for Student Health Center, $7,860***to Industrial Heating & Plumbing Co., 103 South 4th St., St. Joseph, heating, $11,975 ***to H. T. Chapline, Mexico, wiring Conservation Laboratory Building, $275***to S. Burman, 2814 Olive St., plumbing, $1,585. Grand total $53,033. **P.W.A.** Bids Jan. 3. Noted Dec. 30, C. D.

N. H., West Stewartstown—H. P. Cummings Constr. Co., general contractors, Ware, electrical work for County Stock Barn, at County Farm, to A. L. Franks Co., 1196 Elm St., Manchester, for Coos County Farm, West Stewartstown. Noted Jan. 2, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

N. J., Paramus—Bergen Co., Administration Bldg., general contract hospital, to Reliable Constr. Co., 604 Anderson Ave., Grantwood, $259,400***steel and iron, to Breen Iron Wks., 272 Badger Ave., Newark, $18,945***plumbing, drainage and heating, ventilating, to G. J. Tobin, 287 North Ave., Plainfield, $46,997 and $41,646 respectively***electrical work, to Hasbrouck Contr. Co., 240 Main St., Hackensack, $52,411 ***elevators and dumbwaiters, to Burwak Elevator Co., 227 Fulton St., New York, $14,009. Grand total $433,408. **P.W.A.** Noted Dec. 13, C. D.—Dec. 19, E. N.-R.

N. Y., Gloversville—Bd. Educ., City School Bldg., general contract school, to Duncan & Cahill, 3275 6th Ave., Troy***heating, to E. J. Harbison, 213 Union St., Schenectady*** plumbing, to Treher & Jung, Gloversville*** electrical work, to C. F. Noyes, 81 3rd Ave., Gloversville. Noted Feb. 11, C. D.

N. Y., Hamburg—See "Bids Asked."

N. Y., Holland Patent—See "Proposed Work."

N. Y., New York—New York Public Library, 5th Ave. and 42nd St., altering and repairing library, incl. new monel metal roof, day labor, $140,000. **W.P.A.**

N. Y., Poughkeepsie—City, City Hall, structural steel for infirmary building, to Poughkeepsie Iron & Metal Co., 6 Orchard Pl.; cast stone, to Onondaga Litholite Co., 102 North Beech St., Syracuse; millwork and glazing, to Lumb Woodworking Co., Mill St. Noted Dec. 18, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

†N. Y., Rochester—Treas. Dpt. at office Sup. Archt., Wash., D. C., installing freight elevator in U. S. Post Office, to Graves Elevator Co., 280 Lyell Ave., $10,620. Bids Feb. 3. Noted Feb. 7, C. D.—Jan. 23, E. N.-R.

†Federal Government

Public Buildings (Continued)

†N. Y., **Rome**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Ross & Reid Stone Setting Co., 20 E. St. S.W., Wash., D. C., $123,477. Bids Feb. 12. Noted Feb. 17, C.D.—Jan. 23, E.N.-R.

N. Y., **Weedsport**—Swartout & Rowley, general contractors, 548 Mount Hope Ave., Rochester, structural steel for high school for Union School Dist. 2, Town of Brutus, Weedsport, to F. L. Heughes & Co., 1029 Lyell Ave. ***roofing and sheet metal, to Flesch & Schmitt, Inc., 60 Brown St.***ornamental iron, to Hellerman Iron Wks., 1100 East Water St., Syracuse. Noted Nov. 26, C. D.—Dec. 5, E.N.-R.

O., **New Miami** — City, general contract 2 story, basement, 131x163 ft., brick, rein.-con. school, to F. K. Vaughn Building Co., Hamilton, $117,415***plumbing, to Hoffman-Wolff Co., 415 South Main St., Columbus, $10,700 ***heating and ventilating, to H. J. Osterfeld Co., Dayton, $17,754***electrical wiring, to Betshoover Electric Co., Cincinnati, $5,988. Grand total $151,857. **P.W.A.** Noted Jan. 22, C.D.—Jan. 30, E. N.-R.

R. I., **Cranston**—City, City Property Comn., City Hall, foundation excavation for 3 story, basement city hall, to John Ambrose Constr. Co., Inc., 1100 Pontiac Ave., Providence, 40c. per cu.yd. Total est. $270,000. Noted Feb. 5, C.D.—Feb. 13, E. N.-R.

R. I., **Howard** (Cranston)—State, Emergency Public Wks. Comn., State House, Providence, electrical work for male ward building at State Hospital, to Stanford Electric Constr. Co., 4 Westminster St., Providence, $8,250. **P.W.A.** Bids Dec. 9, awarded Feb. 18. Noted Feb. 6, C.D.—Feb. 13, E.N.-R., under "Contracts Awarded."

R. I., **Howard** (Cranston)—Carey Constr. Co., Inc., general contractors, 56 North Main St., Fall River, 200 tons structural steel for Ward 1 building, to Providence Steel & Iron Co., Providence, for State, Emergency Wks. Comn., State House, Providence. Noted Jan. 31, C.D. —Feb. 6, E.N.-R., under "Contracts Awarded."

†**Tenn., Nashville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., installing 1 new passenger elevator, removing and relocating existing passenger elevator in U. S. Post Office and Court House, to Otis Elevator Co., 819 18th St. N.W., Wash., D. C., $15,978. Bids Feb. 11. Noted Feb. 17, C.D.—Jan. 30, E.N.-R.

Tenn., Nashville—J. A. Jones Constr. Co., general contractors, Commercial Bank Bldg., Charlotte, N. C., 2,200 tons structural steel for court house, to Bethlehem Steel Co., Bethlehem, Pa., for Davidson Co. Public Building & Court House Comn., at office of Hon. L. Hickman, co. judge, at temporary Court House, 8th Ave. and Commerce St. Noted Jan. 27, C. D.— Jan. 30, E. N.-R., under "Contracts Awarded."

†**Tenn., Nashville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling old U. S. Post Office and Court House, to Foster & Creighton Co., 724 American Bank Bldg., $152,000. Bids Jan. 29. Noted Feb. 3, C. D.—Jan. 16, E. N.-R.

†**Tex., Baytown**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to J. I. Barnes, Springfield, $46,300. Bids Feb. 12. Noted Feb. 17, C.D.—Jan. 30, E.N.-R.

★ **Tex., Houston**—City, c/o O. F. Holcombe, mayor, and Harris Co., c/o H. L. Washburn, co. aud. **(1)** hospital and outpatients' building **(2)** nurses' home **(a)** general contract **(b)** electrical work **(c)** plumbing **(d)** heating **(e)** elevators, to American Constr. Co., Rusk Bldg., Houston, **(1a)** $1,037,000***to J. T. Taylor, 1st National Bldg., Fort Worth, **(2a)** $225,875 ***to Eugene Ashe Electric Co., 505 Jones St., Fort Worth, **(1b)** $72,770; **(2b)** $11,100*** to Young & Pratt, Barton Springs Rd., Austin, **(1d)** $58,900 **(2d)** $13,500***to American Plumbing & Heating Co., 829 Baronne St., New Orleans, La., **(1c)** $128,597***to Jud & Ormond, 703 North Flores St., San Antonio, **(2c)** $41,390***to Westinghouse Electric Elevator Co., Insurance Bldg., Dallas, **(1e and 2e)** $34,850. Grand total $1,623,982. **P.W.A.** Bids Jan. 18. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

Tex., Waco—Bd. Educ., c/o H. L. Richey, painting 3 story, part basement, 149x260 ft., modern brick, rein.-con. Junior High School, to C. Barker, Waco, $1,800. **P.W.A.** Noted Jan. 10, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Utah, Morgan—Morgan Co. School Dist., general contract superstructure school, to Campion Co., Ogden, $127,486. **P.W.A.** Bids Jan. 28. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

Vt., **Poultney**—C. G. Noyes, general contractor, 211½ Centre St., Rutland, electrical work for high school, for Town, to R. Duell, Merchants Row, Rutland***stone, to Green Mountain Marble Co., West Rutland***building finish, to Rutland Sash & Door Co., Inc., 127 Strongs Ave., Rutland, Town, Dr. O. F. C. Clough, chn. School Directors, heating and plumbing for above, to M. H. McLaughlin, 7 Evelyn St., Rutland, $11,908. **P.W.A.** Noted Jan. 29, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

†*Federal Government.*

Wash., Bellingham—School Dist., electrical work for alterations seven schools, to H. E. Mills, 1511 Cornwall St., $6,029; mechanical work, to Thiel Hardware & Plumbing Co., 1135 State St., $2,239. Noted Feb. 18, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

COMMERCIAL BUILDINGS

PROPOSED WORK

Ariz., Grand Canyon — Union Pacific Parks Co., Cedar City, Utah, plans reconstructing lodge on North Rim Grand Canyon. $250,000.

Conn., Bridgeport—Motorways Hotel Co., W. J. Eastman, trustee, 28 Fairfield Ave., plans being completed by E. B. Caldwell, 1029 Fairfield Ave., 4 story, 75x150 ft., brick, steel, terra cotta hotel, Water St. $250,000.

Conn., New London—Connecticut College for Women, K. Blunt, pres., plans by W. Platt & G. Platt, 101 Park Ave., New York, brick, stone library addition. $150,000. Indefinite when plans will be drawn. Noted Jan. 23, C. D.— Jan. 30, E. N.-R.

Conn., Stamford—Holbrook Estates, Inc., C. D. Willcutt, 1 Atlantic St., Stamford, plans to start and complete 10 to 20 residences during the summer, developing 47 acres in Strawberry Hill Section; 68 acres May Apple Rd. Section; 21 acre Strawberry Hill to be started soon. House and lot to be developed for about $15,000. Total est. $200,000. Road construction and excavating, to C. H. Sincerbeaux, 45 Culloden Rd.

Ind., Rochester—The Boston Store plans constructing department store, Est. about $140,000. **Maturity indefinite.** Architect not appointed.

Ky., Louisville—Roman Catholic Orphanage Society, Bishop J. A. Floersch, 1118 South 3rd St., in charge, plans orphanage. $300,000. Architect not appointed.

Md., Baltimore—Belvidere Hotel Co. plans by Taylor & Fisher, 1012 North Calvart St., modernizing and renovating hotel building on Charles and Chase Sts. $350,000. Noted Jan. 22, C. D.—Jan. 30, E. N.-R.

Mich., Albion—Starr Commonwealth of Boys, Albion, plans by M. R. Burrowes, 415 Brainard St., 2 story, basement, rein.-con., steel, concrete school, plain found. Est. $150,000.

Mich., Detroit—Smith, Hinchman & Grylls, archts., 800 Marquette Bldg., soon takes bids 2 story, basement, 35x140 ft., brick, steel, rein.-con. telephone exchange, plain found., Grand River Ave., for Michigan Bell Telephone Co., Cass Ave. $150,000. Noted Dec. 5, C. D.— Dec. 12, E. N.-R.

Mo., St. Louis—Audrey Realty Co. (owner), c/o E. A. Freund, pres., 416 Wainwright Bldg., and St. Louis Amusement Co., (lessee), Ambassador Bldg., plans by O. W. Stiegemeyer, 4817 Oleatha Ave., 1 story, brick, concrete theatre, in Clayton, Mo.; also plans by H. K. Graf, 2815 Olive St., brick, concrete theatre, Goodfellow Blvd. and West Florissant Ave. $150,000-$200,000.

Neb., Omaha — World Building Co., 1502 Farnam St., plans store and office, 15th and Farnam Sts. $200,000 or more. Architect not appointed.

N. J., Arlington—St. Stephens Roman Catholic Church, G. N. Murphy, pastor, 155 Beach St., plans by R. J. Reiley, 12 East 41st St., New York, 2 story and basement rectory and church seating 1,100 people. $400,000.

N. J., Glen Rock—A. J. Roughgarden, Hawthorne, plans group seventeen 1 and 2 story, brick dwellings on South Highwood Ave. To exceed $140,000.

N. J., Ridgewood — L. Gold, c/o American Home & Community Realty Co., Hillcrest Rd. and Monroe St., plans group of dwellings and tract development, on Hillcrest Rd. and Monroe St. To exceed $160,000. Site acquired.

N. Y., Brooklyn—Monden Realty Corp., H. Heringman, pres., 26 Court St., plans by M. M. Weinstein, 93 Court St., 6 story apartment, 2420 Kingshighway. Est. about $140,000.

N. Y., Brooklyn—Carroll-Eighth Holding Corp., S. Morsseiff, pres., 99 Wall St., New York, plans by M. N. Ungarleider, 191 Joralemon St., 11 story apartment, 8th Ave. and Carroll St. $400,000.

N. Y., Brooklyn — Brighton Beach Garden Apartments, Inc., 67 Liberty St., New York, plans by Otis Elevator Co., 130 Clinton St., Brooklyn, altering elevators and mechanical equipment in apartment, 1112 Brighton Beach Ave. $50,000.

N. Y., Brooklyn — Corporation, c/o Watson Kristeller & Swift, 68 Williams St., New York, plans group frame dwellings, Beck Rd. Ave. and 19th St. To exceed $200,000. Architect not appointed.

N. Y., Brooklyn—Jacob Kaiser, 2053 82nd St., plans by J. Lubroth, 26 Court St., constructing twenty or more 2 story, 20x35 ft. dwellings, 1603 82nd St. $140,000.

N. Y., Elmira—Elmira Savings Bank, S. Lowman, pres., 415 East Water St., plans by R. T. Bickford, Elmira, bank, 218 East Water St. $150,000 or more. **Maturity early in spring.** Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

N. Y., Flushing—Tru Homes, Inc., 163-18 Jamaica Ave., Jamaica, plans by D. J. Levinson, 161-02 84th Dr., Jamaica, 1 story, brick dwellings, 133rd Ave. and 87th St. $140,000.

N. Y., Flushing—Supro Homes, Inc., 120-08 97th Ave., Richmond Hill, plans by D. J. Levinson, 161-02 84th Dr., Queens Village, constructing group 1 story, frame dwellings, 61st Rd. near Main St. $140,000.

N. Y., Jackson Heights—Solmill Realty Corp., c/o Queensboro Corp., 81-20 37th Ave., plans 6 story apartment, 84th St. and 34th Ave. $150,000. Architect not appointed. Site acquired.

N. Y., Jackson Heights—Three Star Investing Corp., c/o King & King, 40-09 82nd St., plans 6 story apartment, 82nd St. and 35th Ave. $150,000. Architect not appointed. Site acquired.

N. Y., New York—Jarsch Realty Corp., 313 East Houston St., plans by Aaronson & Heidrich 32 Bleeker St., altering heating in three 5 story apartments, 59 Suffolk St. $37,000 with fixtures.

N. Y., New York—Esdo Realty Corp., H. H. Minskoff, pres., 521 5th Ave., plans by H Ginsbern, 205 East 42nd St., 6 story store and apartment, 167th St. and Grant Ave. $175,000.

N. Y., New York—Inwood Apartments, Inc. (Goodman & Mabel), 1450 Bway., plans by G. Miller, c/o owner, 6 story, apartment, 62 Cooper St. $140,000.

N. Y., New York — Corporation, c/o B. Epstein, 4375 Bway., plans by G. G. Miller, 10 West 47th St., 6 story, apartment, 27 Cooper St. $150,000.

N. Y., New York — Victor Land Corp., 612 West 145th St., plans by J. M. Felson, 250 West 57th St., 6 story, brick apartment, plain found., 178th St. and Anthony Ave. $275,000.

N. Y., Niagara Falls—Darojo Realty Co., 270 Bway., New York, plans rebuilding 4 story, basement, office building, 2116 Main St. To exceed $105,000. W. T. Grant Co., 2116 Main St., lessee. Architect and engineer, not appointed.

N. Y., Niagara Falls—Silberg Realty Co., 2112 Main St., plans repairing store, storage and apartment, 2112 Main St. $140,000. Architect not appointed. W. T. Grant & Co., 2112 Main St., lessee.

★ **N. Y., Sunnyside**—Skillman Realty Corp., c/o H. I. Feldman, archt., 15 West 44th St., plans 6 story apartment, Skillman Ave. and 42nd St. $600,000.

N. Y., Woodside—Wynwood Homes, Inc., 179-26 Anderson Rd., St. Albans, plans by A. E. Allen, Garden City, constructing group sixty-five 2 story dwellings, 51st Ave. and 61st St. $260,000.

N. C., Charlotte—F. W. Woolworth Co., 299 Bway., New York, plans by A. F. Winters, assoc. archt., 299 Bway., New York, store and storage, Tryon St. $150,000.

N. C., Wilmington—North Carolina Theatres, Inc., 1st National Bank Bldg., Charlotte, plans modern playhouse, early this fall. Front St. $135,000-$140,000.

O., Columbus—Independent Order of Odd Fellows, 198½ South High St., plans club and temple. To exceed $140,000. Architect not appointed. **Maturity indefinite.**

Okla., Ada—Aldrige Hotel Co., Wewoka, sketches by G. Reid, Oklahoma Savings & Loan Bldg., Oklahoma City, constructing 6 story, basement, 50x140 ft. hotel addition, Main St. $200,000.

Tex., Seguin—Guadalupe College plans college and dormitory buildings. Est. about $140,000. **Maturity indefinite.** Architect not appointed.

Wis., Watertown—St. Marys Hospital, Servants of Holy Ghost, Techny, plans by E. Brielmaier & Sons Co., 735 North Water St., Milwaukee, 3 story, basement hospital addition. To exceed $100,000.

★ **B. C., Vancouver**—Y.M.C.A., 590 Cambie St., plans by McCarter & Nairne, Marine Bldg., and Y.M.C.A. Headquarters, New York, N. Y., constructing rein.-con. Y.M.C.A. building, plain found., Burrard St. at Nelson St. $500,000. **Maturity in 1937-1938.**

★ **Que., Lachine**—Congregation of Sisters of Ste. Anne plans hospital, Ste. Catherine St. $1,000,000. Private plans.

BIDS ASKED

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Forest Hills—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., Poughkeepsie — Vassar College taking bids, general construction, plumbing, heating, electrical work for library. Allen Collens & Willis, 75 Newbury St., Boston, Mass., archts. Noted Dec. 2, C. D.—Dec. 5, E. N.-R.

N. Y., Rochester—Lewiston Avenue Methodist Episcopal Church, 390 Ridgeway Ave., bids about Mar. 1, constructing church, Dewey Ave. near Lewiston Ave., O. W. and H. B. Dryer, 2550 East Ave., archts.

N. Y., White Plains — See "Contracts Awarded."

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Commercial Buildings (Continued)

R. I., Providence — D. Shapiro, archt., 58 Weybosset St., taking bids 3 story, basement, 60x190 ft., brick, steel, timber apartment, concrete found., Waterman and Medway Sts., for Waterman Street Co., c/o Architect. $150,000.

Ont., Timmins — St. Anthony Parish, Rev. Therriault, pastor, taking bids rebuilding church destroyed by fire. $150,000-$200,000. Materials to be purchased. Excavation, to Leo Mascioli, Timmins. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

CONTRACTS AWARDED

Conn., Hartford—Caledonian Insurance Co. of Scotland, 555 Asylum St., 2 story, basement, 65x155 ft. and 40x45 ft. wing, brick, limestone, granite insurance building, also penthouse, Garden and Cogswell Sts., to Industrial Constr. Co., 721 Main St., $200,000. Awarded Feb. 15. Noted Feb. 19, C. D.—Feb. 20, E. N.-R.

Md., Hagerstown—Montgomery Ward & Co., Hagerstown, 3 story, 60x180 ft., brick, concrete store, to J. B. Ferguson Co., Hagerstown. Private plans.

N. Y., Brooklyn — Schumer & Strauss, 26 Court St., 6 story apartment, 13th St. and Brighton Ave., separate contracts now being awarded, $140,000. J. J. Millman, 191 Joralemon St., archt. Noted Jan. 23, C. D.—Jan. 30, E. N.-R.

N. Y., Brooklyn—Falmouth Realty Co., c/o I. Greenholz, 1625 East 31st St., constructing group frame dwellings, 28 Exeter St., day labor and separate contracts. $140,000. B. Freshman, 50 Court St., archt. Noted Jan. 22, C. D. —Jan. 30, E. N.-R.

N. Y., Brooklyn—Veribest Homes, Inc., 287 East 51st St., constructing group 2 story, brick dwellings, 261 East 57th St., day labor and separate contracts. $140,000. M. E. Ungarleider, 191 Joralemon St., archt. Noted Jan. 22, C. D.—Jan. 30, E. N.-R.

N. Y., Brooklyn—Otava Realty Corp., 605 41st St., constructing group brick buildings, 1849 East 32nd St. and vicinity, day labor. $140,000. Material contracts now being awarded. O. B. Almgren, 8605 3rd Ave., archt. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

N. Y., Brooklyn—Hartnat Realty Corp., 912 Avenue S, constructing group 2 story, brick dwellings, 570 East 93rd St., separate contracts and day labor. $140,000. Chester Architectural Service, 26 Court St., archts. Noted Jan. 23, C.D.—Jan. 30, E.N.-R.

N. Y., Forest Hills—**G. L. C. Earle, Inc., 6** Brush St., constructing group 2 story, brick dwellings, Burns and Bye Sts., day labor and separate contracts. $140,000. J. Unger, 39-01 Main St., Flushing, archt. Noted Jan. 29, C.D. —Feb. 6, E.N.-R.

N. Y., Jackson Heights—Hayes Avenue Realty Corp., 189 Montague St., Brooklyn, 6 story apartment, 34th Ave. and 85th St., separate contracts now being awarded. $300,000. J. Tabalchnick, 1838 West 5th St., Brooklyn, archt. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

N. Y., Jackson Heights—Thirty-Five Forty—Eighty-Second Street Corp., 808 East 18th St., brick apartments, 82nd St. and 37th Aves., separate contracts now being awarded. $200,000. Kavy & Kavovitt, 16 Court St., Brooklyn, archts. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

N. Y., New York—Algy Realty Corp., 219 East 171st St., 6 story, brick apartment, 167th St. and Grant Ave., separate contracts now being awarded. $225,000. Noted Jan. 27, C. D. —Jan. 30, E. N.-R.

N. Y., New York—Emerdyke Realty Corp., 572 Madison Ave., constructing 6 story apartment, 4913 Bway., separate contracts now being awarded. $350,000. H. I. Feldman, 15 West 44th St., New York, archt. Noted Jan. 23, C. D.—Jan. 30, E. N.-R.

N. Y., New York — Lansvog Holding Corp., B. London, 21 East 40th St., 6 story, brick apartment, 1707 St. Nichols Ave., separate contracts. $400,000. J. M. Felson, 250 West 57th St., archt. Noted Jan. 27, C. D. — Jan. 30, E. N.-R.

N. Y., New York—Walger Realty Co., Inc., 641 6th Ave., constructing 6 story apartment, Walton Ave. and 153rd St., separate contracts now being awarded. $360,000. Miller & Goldhammer, c/o owner, archts. Noted Jan. 23, C.D.—Jan. 30, E.N.-R.

Pa., Butler—Montgomery Ward Co., 619 Chicago Ave., Chicago, Ill., and Butler, Pa., 3 story, basement, 66x180 ft., brick, steel store, 212 South Main St., to H. Wimer, Inc., Negley Ave., Butler•••plumbing, to Eberles Little Lumber Co., 300 Center Ave.•••heating and ventilating, to Wm. M. Clark Co., New Castle••• electrical work, to Carter Electric Co., Oliver Bldg., Pittsburgh. Noted Oct. 23, C. D.—Oct. 31, E. N.-R.

★ **N. Y., White Plains** — One South Bway. Corp., 211 East 53rd St., Brooklyn, constructing apartment, Main St. and South Bway., to M. Chutick & Sons, 211 East 53rd St., Brooklyn. Est. exceeds $500,000. Contractor now awarding separate contracts. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

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Ont., Ottawa — Ross-Meagher, Ltd., general contractors, painting and glazing for 6 story, basement, brick, steel apartment house, Metcalfe St., for Bytown Realties Ltd., Ottawa, to Duford Ltd., 70 Rideau St.; marble and tile, to J. Jambou & Co., 6790 St. Urbain St., Montreal, Que. Noted Nov. 14, C. D.—Nov. 21, E. N.-R., under "Contracts Awarded."

Ont., Timmins—See "Bids Asked."

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ala., Decatur—MILL—Alabama Hosiery Mills soon takes bids brick mill addition. C. C. Hartman, Greensboro, N. C., archt.

Ark., Pine Bluff — STOCK YARDS — C. I. Staffor & Sons, National Stockyards, Chicago, Ill., Pine Bluff, plans stock yards. Est. $40,-000.

Calif., Baywood Park—FACTORY—Ankertite Products Co., Baywood Park, plans factory. Est. about $45,000.

Calif., Exeter — CANNERY — Exeter Kadota Fig Assn., E. J. Firebaugh, secy., plans cannery. $40,000 or more with equipment.

Calif., Los Angeles — FACTORY — Federated Metals Corp., 2425 Hunter St., soon takes bids 80x140 ft. and 80x240 ft., rein.-con., brick factory, East 26th St. and Indiana Ave. To exceed $37,500. Private plans. Noted Jan. 30, C. D.—Feb. 6, E. N.-R.

Calif., Los Angeles—DISTILLERY—Hepburn & McTavish, 432 Colyton St., R. R. Ranspot, executive vice pres., plans distillery on 7 acre site, Nadeau and Maie Aves. Est. $250,000. Architect not appointed. Owner in market for nine 12,000 to 13,000 gal. tanks, mash tub, cooker and several yeast tubs, etc.

Calif., Los Angeles—WAREHOUSE—California Hardware Co., 1st and Alameda Sts., plans by Austin & Ashley, Chamber of Commerce Bldg., 5 story, 60x126 ft., rein.-con. Class A, warehouse, 107 South Rose St. $85,000. Applied for building permit.

Calif., Napa—DISTILLERY—Hedgeside Distillery, P. De La Montanya, mgr., plans distillery. $75,000 or more.

Calif., Santa Monica — FACTORY — Douglas Aircraft Co., 3000 Ocean Park Blvd., plans by Taylor & Taylor, 803 West 3rd St., Los Angeles, archts. and engrs., 1 story, basement, 300x300 ft. manufacturing unit to be added to west side of present plant, 3000 Ocean Park Blvd. To exceed $100,000. Bids will be taken this week for about 700 tons structural steel.

Conn., Bridgeport—TERMINAL—Penn Haven Terminal Co., 28 Fairfield Ave., W. J. Eastman made plans 2 story, mezzanine, 50x75 ft., brick, steel bus terminal, Water St. $50,000. Private plans.

Conn., Norwalk — PLANT — Angostura-Wupermann Corp., Norwalk, plans alterations and improvements to former Foster-Stewart Co. plant, recently acquired, Main St., for plant to manufacture medicinals, bitters, etc., Main St. Architect not appointed.

D. C. Wash.—WAREHOUSE—**Hecht Co., F and** 7th Sts., plans by Abbott & Merkt & Co., engrs. and archts., 22 East 40th St., New York, constructing warehouse. To exceed $100,000.

Ga., Atlanta—BOTTLING PLANT—Canada Dry Ginger Ale Co., 122 East 42nd St., New York, plans by Russell G. Cory, archt. and engr., 30 Church St., New York, bottling plant.

Idaho, Lewiston—WAREHOUSE—Mason-Ehrman Co. plans constructing warehouse. To exceed $100,000. Architect not appointed.

Ill., Chicago — PLANT — Arrow Match Co., 4527 West Lake St., plans repairing and altering plant. To exceed $40,000. Architect not appointed.

Ill., Chicago—PLANT—Odman Paper Co., 123 West Austin St., plans plant. To exceed $50,-000. Architect not appointed.

Ill., Chicago—CAN FACTORY—American Can Co., 230 Park Ave., New York, plans improving can manufacturing plant acquired from Libby, McNiel & Libby, Union Stock Yards. To exceed $37,000. Private plans.

Ind., Anderson—PLANT—Ward Stilson Co. purchased old Croble Regulator factory building, 3rd and Sycamore Sts., and plans remodeling plant and new dressmaking machinery. $37,000 or more. **Maturity indefinite.** W. K. Stilson, pres. and genl. mgr.

Ind., Muncie — PLANT — Muncie Gear Co. plans 75x140 ft. steel plant addition, incl. new machinery. $37,000 or more with equipment.

Ind., Muncie—PLANT—Owens Illinois Glass Co., 965 Wall St., Toledo, O., plans plant addition, 12th and Macedonia Aves. $37,000 or more.

La., Rodessa—REFINERY, etc.—Panama Refining Co., Overton, Tex., plans altering refinery and storage. To exceed $40,000.

Md., Baltimore — PLANT — Maryland Paper Products Co., 1200 South Eutaw St., plans altering piano factory into paper and paper products plant, West Cross and Eutaw Sts. Est $40,000.

Md., Hyattsville—GARAGE—Archer & Plater archts., 1759 U St. N.W., Wash., D. C. soon lets contract for 1 story, 140x160 ft. auto sales and service building, for Justine Nicholson Motor Co. $75,000.

Mass., Canton — POWER PLANT — Draper Bros. Co., Draper Lane, Canton, plans power plant addition and alterations, Draper Lane. To exceed $40,000. A. L. Nelson, 31 St. James Ave., Boston, engrs.

Mass., Everett—FACTORY—L. Cardelli, 24 Alfred St., plans 2 story, basement, brick, steel, concrete broom factory, 48 Robin St. To exceed $37,000 incl. machinery. Private plans.

Mass., Peabody—PLANT—A. C. Lawrence Leather Co., Engineering Division, Sawyer St., sketches brick, steel leather plant addition, concrete found., Sawyer St. $100,000. Private plans.

Mass., Somerville — DAIRY — W. E. Stuart Co., 80 Blanche St., Cambridge, plans dairy addition and alterations, Green St. To exceed $40,000. Charles T. Main, Inc., 201 Devonshire St., Boston, engrs.

Mich., Detroit—CANDY PLANT—Fanny Farmer Candy Shops, Inc., 7 Griffith St., Rochester, N. Y., plans candy manufacturing plant. $40,-000 or more.

Mich., Detroit—PLANT—Vincent Steel Products Co., 2434 Bellevue Ave., H. Angell in charge, plans improving plant. $37,000 with equipment. Private plans.

Mich., Royal Oak—PLANT—Chase Tool Co. plans plant improvements. $37,000 with equipment.

Miss., Biloxi—PLANT—Standard Oil Co., 430 Bloom St., Louisville, Ky., plans bulk oil plant and storage. $45,000.

Mo., St. Louis—PLANT—International Printing Ink Co., 75 Varrick St., New York, plans repairing fire damaged plant, 106 Dock St. To exceed $40,000. Architect not appointed.

★ **Neb., Omaha**—PACKING HOUSE—Armour & Co., 30th and Q Sts., plans rein.-con. packing house addition, $750,000. **Maturity in spring.** Engineers, c/o owner in Chicago, Ill., engrs.

N. Y., Albany—BAKERY—National Biscuit Co., 449 West 14th St., New York, soon lets contract bakery, Pearl St. Est. about $37,000. L. Wirsching, 449 West 14th St., New York archt.

N. Y., Brooklyn—FACTORY.—Belroe Realty Corp., 25 Willoughby St., L. Zininsky, pres., plans by M. Klein, 65 Court St., 4 story factory, McKibbin St. near Bushwick Ave.

N. Y., Buffalo — FACTORY — K. R. Wilson Foundry Co., 10 Lock St., plans rebuilding plant destroyed by fire. Est. about $150,000 incl. equipment. Architect and engineer not appointed.

N. Y., New York—TRUCKING TERMINAL, etc.—Carolina H. Hinners, 477 East 24th St., New York, plans by W. R. Shirley, Grand Central Terminal, New York, 1 story, trucking terminal and storage, 167 Perry St. $37,000 with equipment.

N. Y., New York—STORAGE, etc.—Cabin Holding Corp., 565 5th Ave., plans by C. Glaser & L. H. Friedland, 18 East 41st St., constructing 2 story, storage, showrooms and loft, 7 East 53rd St. $37,000.

N. Y., New York—FACTORY—Sailors Snug Harbor, 262 Green St., plans 6 story, brick factory, 753 Bway. Est. about $37,000. Architect not appointed.

N. Y., Niagara Falls—YARD, etc.—G. W. Maloney, Michigan Ave., plans yards, storage, and coal handling plant. $50,000 or more. Architect not appointed.

N. C., Goldsboro — PLANT — Sal Esposito Packing Co., Miami, Fla., plans packing plant. Est. about $37,000 with equipment.

N. C., Winston-Salem—INDUSTRIAL—Reynolds Tobacco Co., Winston-Salem, plans large tobacco building, exterior to be of hollow glass blocks. $100,000.

O., Zanesville — STORAGE — Wise Foundry Machine & Supply Co. plans storage and shop. Est. about $37,000. **Maturity indefinite.** Architect not appointed.

Ore., Portland—PLANT—Iron Fireman Mfg. Co., 4785 East 17th St., plans improving plant. To exceed $40,000.

Pa., Pittsburgh—LABORATORY, etc.—Fisher Scientific Co., 711 Forbes St., plans addition to laboratory and plant. $100,000. Davis & Dunnels, Century Bldg., archts.

Pa., Uniontown—PLANT—Dudley Electric & Machine Co. plans rebuilding 1 story plant destroyed by fire. $50,000 or more. Fire loss $75,000. Will purchase and install some new machine shop equipment, etc.

R. I., Pawtucket—PLANT—Newell Coal & Lumber Co. plans repairing fire damaged yards and plant. To exceed $50,000. Fire loss $150,-000. Architect not appointed.

Tenn., Rockwood—PLANT—Russell Eng. Co., 1219 Porterfield St., plans altering former Roane Iron & Coal Co. plant (lime kilns and lime products). $40,000.

†*Federal Government.*

Industrial Buildings (Continued)

Tex., Kerrville — WAREHOUSE — Schreiner Wool Co., preliminary planning 2 story, 90x180 ft., brick, rein.-con. warehouse, plain found.

Tex., Port Neches—STORAGE—Texas Co., 720 San Jacinto St., Houston, plans storage alterations to asphalt plant, tanks, etc. $37,000.

★ **Va., Alexandria**—HYDRO-ELECTRIC PROJECT—Smith Mountain Power Co., 522 Mills Bldg., Wash., D. C., or c/o G. C. Boyer, engr., 1210 Grey Court Ave., Richmond, plans constructing hydro-electric project on Roanoke River. $800,000.

Va., Vinton—RAYON WEAVING MILLS—Roanoke Weaving Co., Vinton, Va., and Greensboro, N. C., soon lets contract rayon weaving mills. Tinker Creek. To exceed $50,000.

Wash., Knappton—STORAGE, etc.—Brix Logging Co. plans storage, store and company dwellings. Est. about $50,000.

Wash., Seattle—WAREHOUSE—Pacific Coast Co., Smith Tower, lets contract later for plumbing and heating, electrical work, sprinkler system and construction of warehouse: at later date owner plans to modernize present 3 story, brick warehouse and other shore structures.

Wis., Milwaukee—GARAGE—Krause Motor Co., 2914 West North Ave., plans by W. L. Hess, 2434 North 38th St., 1 story, 30x120 ft., brick, steel garage, plain found., West North Ave.

Wis., Ripon — GRAIN ELEVATOR — Badger Co-Operative Elevator Co., Ripon, plans constructing grain elevator, Chicago & Northwestern R.R. tracks. Est. about $37,000. **Maturity indefinite.** Architect not appointed.

Ont., Guelph—FOUNDRY—Guelph Foundry Co. plans by Louis Tremog, 158 Water St., constructing 40x104 ft. extension to foundry, Wellington St.

Que., Quebec—STORAGE, etc.—Kirouac Toy Co., Febrique St., plans storage and manufacturing plant, Febrique St. To exceed $40,000. **Maturity indefinite.**

Que., St. Remi—FACTORY—Cambridge Rubber Ltd., prepares plans factory building for manufacture of rubber products, incl. insulating materials.

BIDS ASKED

Me., Portland—BAKERY—Cushman Baking Co., 107 Elm St., bids about Apr. 1, brick, steel, rein.-con. bakery addition, Elm and Lancaster Sts. J. Calvin & J. H. Stevens, 187 Middle St., archts. Noted Jan. 9, C. D.—Jan. 16, E. N.-R.

Mass., Boston—FACTORY—Worcester Tram Rail Co., engrs., 10 T Wharf, taking bids altering 5 story, basement, 32x64 ft., brick sausage factory, South Market St., for Fred W. Baldan & Co., W. J. Tarky, in charge, 5 Fulton Pl. Est. about $37,000.

N. Y., New York—STORAGE, etc.—Public National Bank & Trust Co., 76 William St., bids about Mar. 15 (from selected list of bidders), constructing storage and showrooms, 89 Delancy St. $45,000. G. Schwartz & Gross, 347 5th Ave., archts. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

N. Y., Niagara Falls—PAINT SHOP, etc.—Krueger Motor Sales Co., 835 Winslow Ave., taking bids general contract paint shop and storage building. $40,000. C. F. Obenhack, Gluck Bldg., archt.

N. Y., Tonawanda—TRANSFORMER BUILDING, etc.—Mar. 3, by Eastern States Milling Corp., constructing transformer building, overhead bridge and equipment. A. E. Baxter Eng. Co., 344 Delaware Ave., Buffalo, engrs.

★ **Pa., Phila.**—PLANT—Crown Cork & Seal Co., Inc., Easton Ave. and Kresson St., Baltimore, Md., and 50 East 42nd St., New York, taking bids general and separate contracts can manufacturing plant. Est. $3,000,000. Acquired former plant of Acme Can Co. Noted Feb. 19, C. D.

Wis., Milwaukee—TERMINAL—F. F. Drolshagen, archt., 647 West Virginia St., soon lets contract constructing 1 story, 160x210 ft., steel motor terminal shed, plain found., West Virginia St., for Pfister & Vogel, 647 West Virginia St. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

B. C., Burnaby—PLANT—Pacific Coast Packers Ltd., Telford Ave., taking bids 1 story each, fruit and vegetable canning plants, candy factory and mayonnaise factory, timber, plain founds., McPherson St. $50,000. P. P. Brown, 1302 Vancouver Blk., Vancouver, engr. W. F. Gardiner, 1301 Vancouver Blk., Vancouver, archt. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

CONTRACTS AWARDED

Calif., San Francisco—PAINT MANUFACTURING PLANT—Glidden Co. of California, 1300 Seventh Ave., reconstructing and making additions for paint manufacturing plant, Daggett and 7th Sts., freight elevator, Transite exterior. Est. $70,000. Owner builds. E. L. Ralston, California Hotel, supt. of construction. T. Ronneberg, Crocker Bldg., engr. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

Calif., Santa Monica—PLANT—Douglas Aircraft Corp., 3000 Ocean Park Blvd., steel for factory, to Consolidated Steel Corp., 6500 East Slauson Ave., $85,000; steel and steel erection for hangar, to McClintic-Marshall Co., 11,100 South Central Ave., Los Angeles, about $120,000. Noted Nov. 10, C.D.—Nov. 28, E.N.-R.

Calif., Stockton—PLANT—Lindgren & Swinerton, general contractors, 225 Bush St., San Francisco, rein.-con. reinforcing steel for cold storage unit, South Center St., to Kyle & Co., Stockton, for National Ice & Cold Storage Co., 85 2nd St., San Francisco•••cork insulation, to Mundet Cork Corp., 440 Brannan St., San Francisco•••plumbing, to W. T. Gibson, 123 South Grant St., Stockton. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

★ **Calif., Woodland**—SUGAR REFINERY—Spreckels Sugar Co., 2 Pine St., San Francisco, well drilling for beet sugar refinery, to Altman & Cooper, Woodland. Total est. $1,500,000. Noted Oct. 29, C.D.—Oct. 31, E.N.-R.

Conn., Bridgeport—PLANT—E. and F. Constr. Co., general contractors, 94 Wells St., roofing for 1 story, 84x188 ft., third story addition to plant, to H. J. Thompson Roofing Co., 785 Housatonic Ave., for Casco Products Corp., 1333 Railroad Ave.; structural steel, to Connecticut Steel Erecting Co., 1043 State House, New Haven. Noted Jan. 20, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Conn., Bridgeport—FACTORY—Braunworth & Co., 60 Main St., general contract 1 story, 87x111 ft. brick, stone, rein.-con. factory addition, to E. and F. Constr. Co., 94 Well St. Est. $40,000. Noted Feb. 13, C.D.—Feb. 20, E.N.-R.

Conn., Bristol—FACTORY—Ingraham Co., 392 North Main St., general contract 3 story, 40x80 ft. wide, 160 ft. long, brick, steel light manufacturing building with storage and shipping facilities, North Main St. to Torrington Building Co., 182 Church St., Torrington. Est. $100,000. Private plans.

Conn., Hartford — WAREHOUSE — Pioneer Fruit & Comn. Co. 103 Connecticut Blvd., J. C. Di Pietro, general contract 1 story, basement, 65 x 75 ft. and 65 x 105 ft., brick, steel, concrete fruit and produce warehouse, Conn. Blvd. and Kilbourne St., to G. Cudemo, Inc., 983 Main St. Est. $45,000. (Correction—contractor). Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

Conn., Hartford—FACTORY—Allyn Wadhams Co., general contractors, 15 Lewis St., painting for factory, Orange and Arbor Sts., for Underwood Elliott Fisher Co., 410 Asylum St., to Benjamin Slitt, Inc., 275 High St.; special finish, to L. F. Dettenhorn Woodworking Co., 337 Sheldon St. Noted Jan. 29, C.D.—Feb. 6, E.N.-R., under "Contracts Awarded."

Conn., Putnam—PLANT—Putnam Woolen Corp., general contract brick, steel, concrete boiler plant, to E. J. Cross Co., 82 Foster St., Worcester. Est. $37,000. J. C. Bogue, 25 Huntington Ave., Boston, Mass., archt.

Ga., Macon—SERVICE BUILDING—International Harvester Co., 606 South Michigan Ave., Chicago, Ill., service building and shop, to W. D. Griffin, Macon. Est. $37,000 with equipment.

Idaho, Boise—REFRIGERATION PLANT—Boise Cold Storage Co., 15th and Railroad Sts., 2 story, basement, 140x190 ft. cold storage plant, to G. M. Reese, Boise. $58,680. Noted Oct. 28, C. D.—Oct. 31, E. N.-R.

La., Rodessa—PLANT—Pelican Oil & Gasoline Co., Shreveport, constructing gasoline absorption plant, to Frick-Reid Co., Tulsa, Okla.; spur track and railway siding for plant by day labor and separate contracts, by Kansas City Southern Ry., 11th and Wyandotte Sts., Kansas City, Mo. Est. $200,000.

Mass., Everett—PLANT—Merrimac Chemical Co., Chemical Lane, general contract 2 story, basement, 50x90 ft., brick, concrete, structural steel, serric sulphate building, concrete pile found., Chemical Lane, to Wm. M. Bailey Co., 88 Broad St., Boston. Total est. exceeds $37,000. General contractor awarded contract for concrete piles, to New England Foundation Co., Inc., 38 Chauncy St., Boston•••roofing, to Federal American Cement Tile Co., 250 Stuart St., Boston•••structural steel, to New England Structural Co., 310 Second St., Everett.

Mass., Salem—FACTORY—Hygrade Sylvania Corp., W. E. Poor, vice-pres., 60 Boston St., general contract 2 and 3 story, 40x80 ft., 60x120 ft., 60x80 ft., brick, timber, concrete found., incl. sprinklers and freight elevator, to Leslie R. Porter Co., 156 Stuart St., Boston, to exceed $100,000. Awarded Feb. 13. Noted Jan. 22, C. D.—Jan. 30, E. N.-R.

Mich., Muskegon — REFINERY — Old Dutch Refining Co., J. Borden, pres., installation of conversion unit at Muskegon crude oil refinery, to T. V. P. Corp., 90 West St., New York. Est. $200,000. Contractor soon lets contracts for materials. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

Mich., West Branch—REFINERY—Producers' Refining, Inc., C. J. Westlund, pres. and mgr., constructing 1,500 bbl. crude oil refinery in Ogemaw oil field, separate contracts awarded. $75,000. Private plans.

Nevada—GRAVEL PLANT—Western Pacific R.R. Co., J. W. Williams, ch. engr., Mills Bldg., San Francisco, Calif., constructing gravel screening and crushing plant, 3000 daily tons capacity for furnishing screened, graded, ballast gravel for roadbed improvement, to Utah Sand & Gravel Products Corp., Interurban Bldg., Salt Lake City, Utah. $75,000. Bids Feb. 14.

N. Y., Buffalo—FACTORY—Trico Products Corp., 817 Washington St., general contract factory, to J. W. Cowper Co., Rand Bldg. General contractor awarded steel, to Bethlehem Steel Co., Bell and Abby Sts.•••electrical work, to Frederick Truscott & Sons, 70 Exchange St.•••heating and boiler, to J. Davis, Root Bldg.•••plumbing, to C. C. Grimm, 259 Delaware Ave., Buffalo. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

N. Y., Long Island City—WAREHOUSE—Aronaut Realty Corp., c/o General Motors Corp., Detroit, Mich., 1 story, 200x282 ft. warehouse and storage, 30th Dr. near Vernon Blvd., separate contracts now being awarded. To exceed $75,000. Noted Jan. 22, C. D.—Jan. 30, E. N.-R.

N. Y., New York—GARAGE, etc.—G. D. Glass, 33-60 180th St., Flushing, general contract garage, 426 East 29th St., to Lane Bros., c/o P. Markowitz, archt., 5 Beekman St. Est. $37,000. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

N. Y., New York—STORAGE, etc.—Garry Estates, 270 Bway., general contract storage, loft and showrooms, 1030 3rd Ave., to Wheeler Eng. Co., 369 Lexington Ave. Est. about $120,000. Separate contracts awarded. A. Weiser, 240 Madison Ave., archt.

N. Y., Syracuse—PLANT—International Harvester Co., 606 South Michigan Ave., Chicago, Ill., general contract branch house, to Dawson Bros., Union Bldg. Est. $105,000. Noted Oct. 31, C.D.—Nov. 7, E.N.-R.

N. Y., Syracuse—PLANT—International Harvester Co., 606 South Michigan Ave., Chicago, Ill., furnishing, driving piles for plant addition, Teall Ave., to Raymond Concrete Pile Co., Cedar St., New York. Noted Feb. 21, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

N. Y., Syracuse—WAREHOUSE, etc.—John Morrel & Co., 111 North West St., cut stone for warehouse and office, to Engel Cut Stone Co., Bedford, Ind.•••steel sash, to Detroit Steel Products Co., Union Bldg., Syracuse•••terra cotta, to Federal Seaboard Terra Cotta Co., 10 East 40th St., New York•••metal windows, to S. H. Pomeroy Co., 280 East 134th St., New York. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

O., Cleveland—FACTORY—Clark Controller Co., P. C. Clark, pres., 1146 East 152nd St., 1 story, 40x121 ft. factory and office addition (top), 1146 East 152nd St., to J. L. Hunting Co., 99 Chester Bldg. Est. $40,000. Awarded Feb. 14. E. G. Hoefler, 5005 Euclid Ave., archt.

O., East Canton — FACTORY — Hoover Co., brick, steel factory addition, to Warren Hoffman Co., Mellett Bldg. Est. $100,000. C. Firestone, Renkert Bldg., archt.

O., Massillon—BOILER HOUSE, etc.—Eaton Mfg. Co., C. F. Ochs, pres.-genl. mgr., 1 story, brick, steel boiler house and altering factory, to B. H. Constr. Co., Inc., Massillon. Est. $50,000. Awarded Feb. 12. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

Pa., Schenley—WAREHOUSE—Rust Eng. Co., general contractors, Clark Bldg., Pittsburgh. 800 tons reinforcing steel for storage plant, to Carnegie-Illinois Steel Co., Carnegie Bldg., Pittsburgh, for J. S. Finch Co. Products. Noted Feb. 5, C. D.—Feb. 13, E. N.-R., under "Contracts Awarded."

S. C., Florence—BAKING PLANT—American Bakeries, Florence, baking plant, all separate contracts awarded. Est. $50,000.

Tenn., Memphis—PLANT—Indiana Flour Co., Inc., 96 West Iowa St., altering storage into cotton and burlap manufacturing plant. Linden Ave. and Southern R.R. tracks, all separate contracts awarded. Est. about $37,000, incl. equipment.

Tex., Austin—PLANT—American Statesman, Austin, 3 story addition to building (now under construction), to Moore Constr. Co., 1600 West Ave. Est. $40,000 or more.

Va., Richmond — WAREHOUSE — Miller & Rhoads, 5 story, 64x130 ft. warehouse, 517-519 North 4th St., to A. J. Seville, Inc., Richmond. Carneal, Johnston & Wright, archts.

Wyo., Lusk—OIL EXTRACTION PLANT—Continental Oil Co., Continental Oil Bldg., Denver, Colo., 4 oil extraction buildings, to Stearns Rogers Mfg. Co., 1720 California St., Denver, Colo.

†*Federal Government.*

For official proposal advertising see Searchlight Section

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of PROFITABLE OPERATIONS
LE TOURNEAU FLEET USERS

The best testimonial, we believe, to the profitable earth-moving of LE TOURNEAU equipment is the fact that so many successful contractors are LE TOURNEAU fleet users. More than 100 now operate three or more LE TOURNEAU units—and they all started with one on trial. Here are a few of them, selected to show that LE TOURNEAU equipment operates profitably the country over:

American Aggregates Corp.	Piedmont, Ohio
Guy F. Atkinson	San Francisco, Calif.
Bechtel-Kaiser Co., Ltd.	San Francisco, Calif.
Border Electric & Telephone Co.	Tijuana, Mexico
W. E. Callahan Construction Co.	Yuma, Arizona
L. Coluccio & Co.	Seattle, Washington
Dunn & Baker	Klamath Falls, Ore.
S. E. Evans	Van Buren, Arkansas
Benjamin Foster Co.	Philadelphia, Pa.
Grace Bros.	Honolulu Ter., Hawaii
Green River Lumber Co.	Green River, Wyoming
S. J. Groves & Sons Co.	Gardner, Montana
C. V. Hallenbeck	Denver, Colorado
Isbell Construction Co.	Reno, Nevada
Peter Kiewit Sons Co.	Omaha, Nebraska
Jan Le Can	Bordeaux, France
Lewis County	Washington
Lewis & Frisinger	Ann Arbor, Mich.
John Mowlem & Co., Ltd.	London, England
W. H. Noel Company	Carpio, N. D.
John Oman, Jr.	Nashville, Tenn.
B. Perini & Sons	Framingham, Mass.
Setauket Contracting Co.	Long Island, N. Y.
Six Companies, Inc.	Boulder City, Nev.
Tennessee Valley Authority	Iuka, Miss.
Winston Bros.	Minneapolis, Minn.

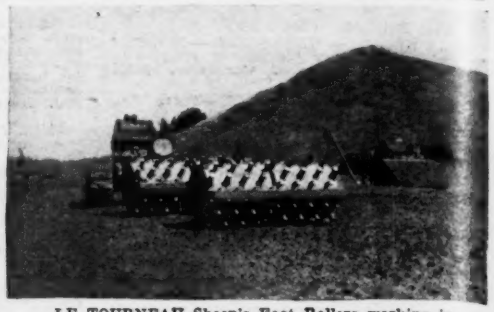
The experience of these users proves that LE TOURNEAU equipment moves more yardage quicker and at less cost. Talk to them; they are our best salesmen. Visit their jobs; see for yourself what LE TOURNEAU equipment is doing.

R. G. LE TOURNEAU INC.

Peoria, Illinois **Stockton, California**

Cable Address: "Bobletorno"

ANGLEDOZERS—BULLDOZERS—BUGGIES—CARRYALL SCRAPERS — CRANES — ROOTERS — SHEEP'S FOOT ROLLERS—POWER CONTROL UNITS—TRAILERS



LE TOURNEAU Sheep's Foot Rollers working in tandem—part of a LE TOURNEAU fleet owned by Payton Brothers of San Francisco, California.

Lane Construction Company, New England, owner of nine LE TOURNEAU CARRYALLS, cuts operating costs by working his CARRYALLS in tandem hookups.

Three of Chas. Weaver's LE TOURNEAU CARRY-ALL fleet moving earth on a Mississippi Highway job.

Two of seven LE TOURNEAU CARRYALLS at work for Edward H. Ellis, Inc., on the Chesapeake-Delaware Canal.

LE TOURNEAU